

WED-160

# Full Digital Ultrasonic Diagnostic System

(Version: V1.4)

## Operation/Technical Manual

**SHENZHEN WELL.D MEDICAL ELECTRONICS CO. LTD.**

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# Preface

## Statement

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- Information in this document is not annotated to change. The manufacture shall not state nor observe any warranty basing on this point, and definitely give up any implied warranty basing on any special purpose of selling or making benefit.
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- Some pictures in this manual, which are schematic diagrams for indication only, may disaccord with the real object, and then the real object should be regarded as the final.
-  is trade marks of Shenzhen Well.D Medical Electronics Co., Ltd. Any abuse of these trade marks without permission will be sued to assume legal responsibility according to laws.

## Manufacturer's warranty

- Shenzhen Well.D Medical Electronics Co., Ltd. assumes the responsibility for equipment security, reliability and performance only under the preconditions that the disassembly, assembly and maintenance of the equipment are all performed by its assigned professional and the equipment is used strictly in compliance with the operation manual.
- Shenzhen Well.D Medical Electronics Co., Ltd. ensures a guarantee period within a year and a half since the delivery day and promises there is no problem with the new equipment in material and technology. Within the guarantee period, Shenzhen Well.D Medical Electronics Co., Ltd. will maintain the equipment and replace the parts of non-man-made damages free of charge. But will not repair or replace the equipment surface if it is damaged.
- This guarantee is only available for failures occurred when the equipment is operated in compliance with the operation manual. And the guaranteed equipment can only be used in the prescribed range given in manual.
- This guarantee excludes losses or damages caused by external reasons such as thunder struck, earthquake, theft, unsuitable use or abuse and refitting the equipment.
- Shenzhen Well.D Medical Electronics Co., Ltd. shall not be responsible for damages caused by other devices or arbitrary connection to other devices.

- Shenzhen Well.D Medical Electronics Co., Ltd. shall not be responsible for losses, damages or injuries caused by delayed service request.
- When there is problem with the products, please contact Shenzhen Well.D Medical Electronics Co., Ltd. and explain the equipment model, serial number, date of purchase and the problem.

## **Matters need Attention**

- To ensure operational safety and long-term stable equipment performance, please read this operation manual closely and understand the equipment functions, operation and maintenance at all points before operating the equipment, especially contents of "Warning", "Caution" and "Note".
- Maloperation or inobservance of the instructions given by manufacturer or its agents may result in equipment damage or personal injury.
- The following convention works through this manual to lay special emphasis on some information.
  - ◆ "Warning": Stands for neglect of it will cause severe personal injury, death or realized property loss.
  - ◆ "Caution": Stands for neglect of it will cause slight personal injury or property damage.
  - ◆ "Note": to remind user of installation, operation or maintenance information. These information is very significant but with no risk. Any warning against dangers shall not be contained in NOTE.

## **Safety labels**

### **Equipment labels explanation:**

	Type B equipment
	Note! Refer to accompanying documents
	Turn-on (general supply)
○	Disconnect (general supply)
	VIDEO
	Equipotential
IPX7	Protection against dripping water
	USB
	XGA

**Packing and transportation labels explanation:**

	Handle carefully
	Temperature limit
	Upward
	Piling layer limit
	Keep dry
	Protect against heat

**Safety classification****According to the degree of safety of application in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide:**

WED-160 not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide;

**According to the mode of operation:**

Continuous operation;

**According to the degree of protection against harmful ingress of water as detailed in the current edition of IEC 529:**

Main unit is general equipment, the probe is enclosed equipment protected against the effects of immersion, IPX7.

**According to the type of protection against electric shock:**

Class I equipment energized from an external electrical power source.  
equipment;

**According to the degree of protection against electric shock:**

Type B

**General tips for equipment operation****◆ In operation**

1. Heat radiation holes are strictly prohibited to be covered.
2. After closedown, do not switch on the equipment within 2 - 3 minutes.

3. On scanning, if any abnormal case is found, stop scanning immediately and shut down the equipment.
4. The patient is prohibited to touch any non-applied part of the equipment.
5. When operating, do not press the keyboard panel too much, otherwise the equipment might be damaged.

#### ◆ **After operation**

1. Power off the equipment.
2. Pull out the plug from power supply socket instead of pulling the cable.
3. Clean off the couplant on the probe with soft medical sterilized cotton ball.
4. Put the probe into the special case.

### **General Safety Message**

Safety of the operator and patients and reliability of the equipment are taken into consideration during designing and producing, the following safety precaution must be implemented:

1. The equipment shall be operated by qualified operating staff or under their instructions.
2. Do not open the equipment and change the parameters without permission. If necessary, please turn to for Shenzhen Well.D Medical Electronics Co., Ltd. or its authorized agent for service.
3. The equipment has already been regulated into its optimal performance. Do not adjust any preset control or switch unless operate as per instructions in the manual.
4. If there is equipment failure, please shut down the equipment at once and contact for Shenzhen Well.D Medical Electronics Co., Ltd. or their authorized agent.
5. If it is needed to connect the equipment with other company's electronic or mechanical devices , please contact Shenzhen Well. D Medical Electronics Co., Ltd. before connection.
6. Equipment operation, storage and transportation environment

Environmental requirements on normal operation:

- a) Environment temperature range: 0°C～+40°C
- b) Relative humidity range: ≤80%
- c) Atmosphere pressure range: 70KPa～106KPa

Environment requirements on equipment storage and transportation:

- d) Environment temperature range: -20°C～+55°C
- e) Relative humidity range: <80% (20°C)

7. Do not hit the fragile TFT-LCD display. If it cracks, deal carefully with it in case the liquid crystal gets into eyes or mouths.
8. Must not hit the inner chargeable Li-ion battery nor throw it into fire in case it trigger an explosion ; Do not short circuit the battery output electrodes in case the battery be damaged; and please use the original binding charger to charge the battery. More over, because used battery will cause environment pollution, please handle the battery correctly for recovery processing.
9. Must not disassemble the power supply adapter. If failures happen, it should be handled by the professional; the charging output can only be used for charging the battery of the equipment, any improper use on other battery may cause explosion, fire and other unexpected hazards.
10. Must not short circuit the output of the adapter, a long term short circuit shall result in adapter damage.
11. Please use standard power cord as the input line of the network power supply for the adapter to reduce risk.
12. Shenzhen Well.D Medical Electronics Co., Ltd. shall not take any responsibility for any risk resulted from unauthorized re-fitment by the users.
13. To disconnect the equipment from the power supply network by unplug the adapter from the power supply network.
14. Refer to appendix A for sound output parameters.

## **Contraindication**

- ★ This equipment is not suit for contain-gas viscera, such as lung examine..。
- ★ Suggesting not to examine the wounded or urgent inflammation part, it could Cause across infect.
- ★ Below patient forbided to use vagina and recta probe:  
Vagina colpitis, such as colpitis, and sexual illness; discoverture people; vagina abnormality; menses; vagina shrink;vagina ultrasound exame difficulty person; vagina bleeding; placenta front sufferer.
- ★ Below sufferer is forbidden to puncture:  
high blood pressure, coronary heart disease, cror obstacle and haemorrhage separative sufferer.

**Warning**

**When WED-160 works in strong electromagnetic environment exceeding its statement, its image might be interfered and the diagnoses could be influenced. At this time, please stop operating until the EMC interference is removed.**

**Warning**

**When WED-160 works at the state of overlapping or paralleling with other equipments, there might be unexpected EMC problems; If it must work close to other equipments, please observe carefully and check if some equipment is influenced by unexpected EM coupling.**

**Warning**

**Replacement of non-standard probe parts may cause unexpected EMC problem.**

**NOTE**

**Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC standards (e.g. IEC 60950 for data processing equipment and IEC 60601-1-1 for medical equipment). Furthermore, all configurations shall comply with the valid version of the system standard IEC 60601-1-1. Everybody who connects additional equipment to the signal input or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of the valid version of the system standard IEC60601-1. IF in doubt, consult the technical service department or your local representative.**

# **1 Summary**

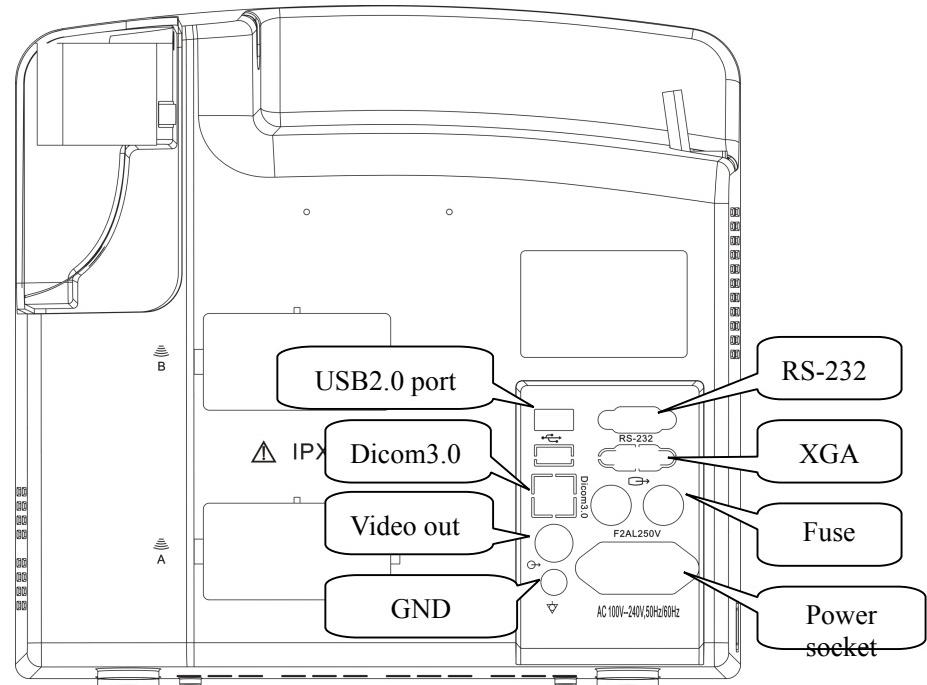
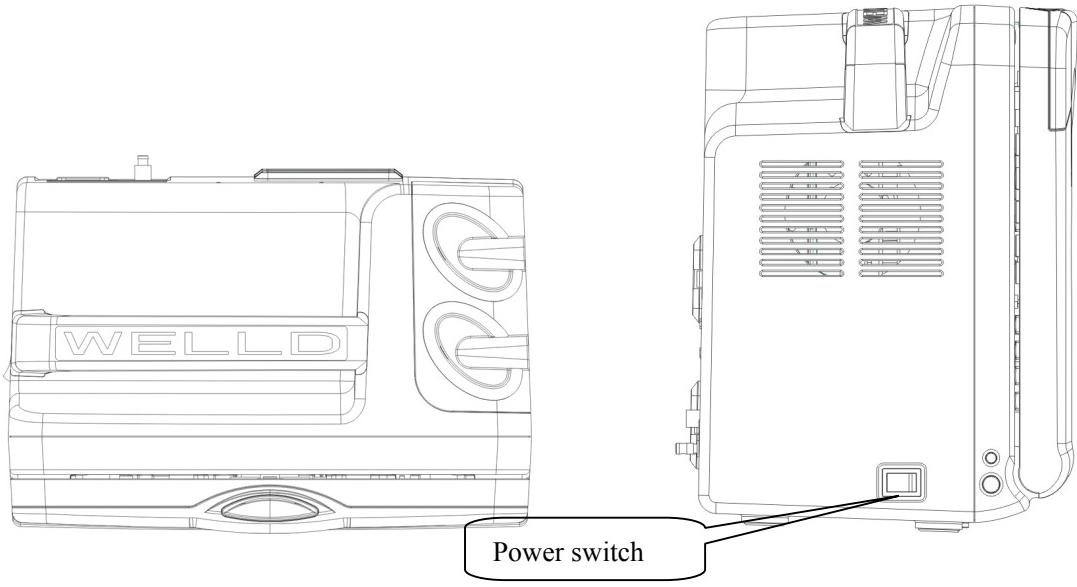
## **1.1 Brief Introduction**

- WED-160 is a high resolution convex/linear array scanning ultrasound diagnostic system ,which utilizing the PC control and digital scan converter(DSC) while adopting multiple technologies such as digital beam forming (DBF) , real-time dynamic aperture (RDA), dynamic receive apodization (DRA), dynamic receive focusing (DRF), dynamic frequency scan (DFS), 8-TGC as well as frame correlation , and it can support various linear and convex array probes with a wide range of frequency.
- It provides five display modes as B、B+B、B+M、M、4B and gray scale of 256 levels.
- It provides such functions as real-time ,freeze, magnification, up and down flip, left and right flip ,edge enhancement, gamma calibration of the picture.
- It allows the continuous playback and single frame play of 500 frames at most, while static pictures of 1000 frames can be stored and recalled at most. The patient data can be saved while saving the pictures.
- It provides multiple level regulation for scanning depth, scanning angle, dynamic range, acoustic output power, frame correlation factors ,focus number, distance between focuses, focus position.
- It functions at display of date and time; annotation of name ,sex ,age of patients, doctor and hospital's name ;full screen annotation. It allows to switch in the Chinese and English operating interface, to input in Chinese or English input mode, and to choose the arrow mark as well as 40 body posture marks.
- It possesses abundant software such as routine measurement (including distance, area and girth, angle and volume),heart measurement (including distance ,time, slope , heart rate)and obstetric measurement ( to estimate the gestational weeks ,expected date of confinement and fetus weight by BPD、CRL、GS、FL、HC、AC)
- This device has the DICOM3.0 port, thus can transmit the picture in the DICOM format. It also provides the color video output, thus it can be connected with the external display with the big screen .In addition, the device has the high speed USB2.0 port ,thus the picture can be saved into the portable storage device and it can be connected with an external video printer. There is a built-in memory with high-capacity which can save a large mount of pictures.
- The device has a injection moulding envelop and the usage of non-industrial frequency transformer switching power supply, programmable parts and surface mounting technology (SMT) make the whole unit highly compact, small in volume and light in weight.

## **1.2 Range Of Application**

Application in abdominal, Obstetric, Cardiac, small parts sonography.

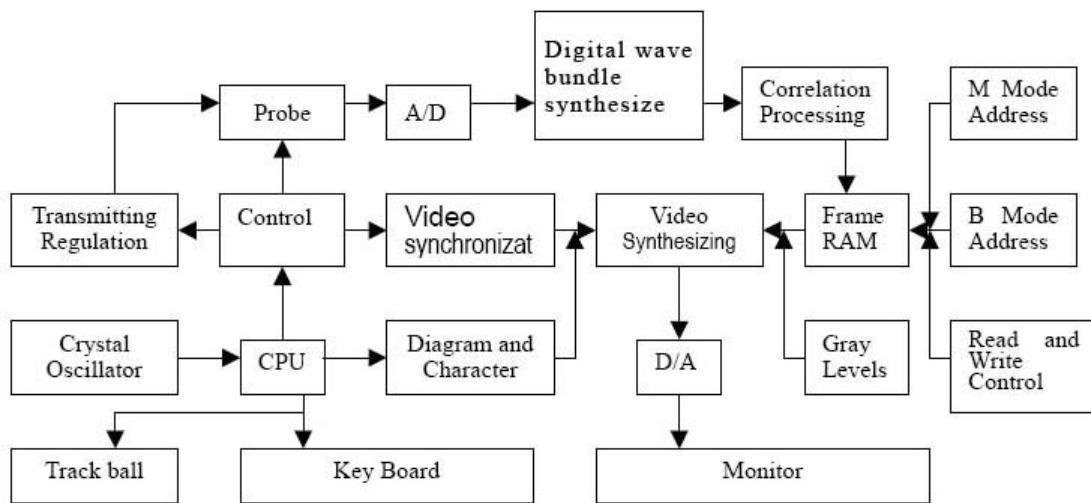
### 1.3 Appearance



## 1.4 Technical Specification

Probe		C3-1/60R/3.5 MHz convex array	L3-1/7.5MHz HF linear	C1-6/20R/5.0MHz micro convex	EC1-1/13R/6.5MHz endo-vaginal
Display depth (mm)		250 (max)			
Maximal detect depth (mm)		≥190	≥80	≥90	≥90
Resolution (mm)	Lateral	≤2 (depth≤80) ≤3 (80<depth≤130)	≤1 (depth≤60)	≤1 (depth≤40)	≤1 (depth≤40)
	Axial	≤1 (depth≤80)	≤0.5 (depth≤80)	≤0.5 (depth≤40)	≤0.5 (depth≤40)
Blind zone(mm)		≤3	≤3	≤2	≤2
Geometric position precision	Horizontal	≤0	≤3	≤4	≤2
	Vertical	≤3	≤5	≤2	≤2
Monitor size		12.1 Inch TFT LCD			
Display mode		B, B+B, B+M, B+M/M, M, 4B			
Image gray scale		256 Scale			
Cine loop		≥600 Frame			
Image storage		≥1000Frame			
Scan angle		Adjustable			
Scan depth		40mm-250mm			
Image flip		Up/down, left/right, black/ white			
Image Process		GAMA, Image Smoothen, THI, Pseudo color, Histogram, Zoom			
Focus		Focus Number, Focus position, Focal space			
Measure		Distance, circumference, area, volume, heart, GA, FW, EDD			
Character display		Date, clock, name, PID, age, Sex, hospital name, doctor,			
Notation		full-screen character editor, posture mark, Position indication			
USB port		USB2.0			
power consumption (MAX)		100VA			
Net weight		6.4kg			
Size		289.16mm×304.96mm×222.02mm			

## 1.5 Electric principle block diagram



## 1.6 Standard configurations

- ✓ Mainframe
- ✓ C3-1/60R/3.5MHz convex array
- ✓ PS cable
- ✓ 2 pieces of fuse tube F2AL250V
- ✓ Coupling gel 250ml
- ✓ User Manual
- ✓ Final examination report
- ✓ Packing List

## 1.7 Optional pieces

- ✓ C1-6/20R/5.0MHz Micro-convex probe
- ✓ L3-1/7.5Mhz HF linear probe
- ✓ EC1-1/13R/6.5MHz Endo-vaginal probe
- ✓ Monitor
- ✓ Video printer

### Warning:

**Please use the spare parts specified above. The manufacturer shall not bear the responsibility of safety problem, unexpected EMC performance drop caused by arbitrary adoption of non-specified spare parts.**

## 2 Installation

### 2.1 Operation environmental requirements

- Environment temperature range: 0°C ~+40°C
- Relative humidity range: ≤80%
- Atmosphere pressure range: 70kPa~106kPa
- Power supply: a.c. 100V~240V, 50Hz/60Hz
- Avoid strenuous vibration during operation; Keep away from equipments with high electric field, high magnetic field and high voltage; avoid strong sunlight on the display; Keep the equipment well-ventilated, damp proof and dustproof.

#### Note:

**Check according to the "packing list" after uncasing and make sure that there is no shipping damage, and then install the equipment according to requirements and methods described in "Installation".**

#### Warning:

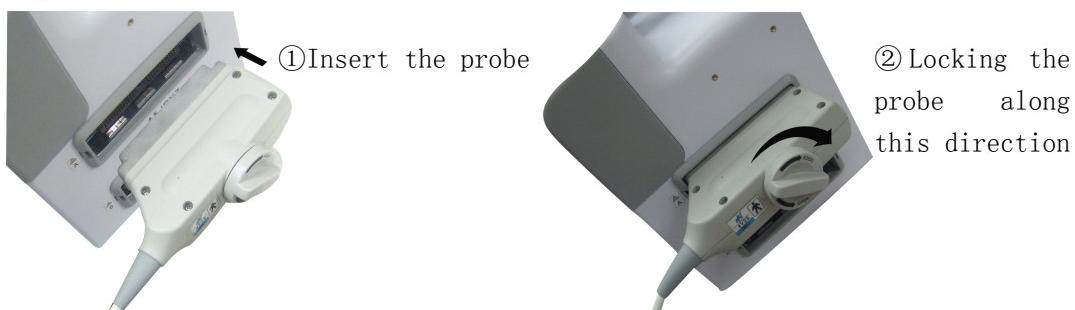
**If there is breakage at unpacking check, it is banned to use the device to ensure security.**

**The probe should be protected from falling off or crashing and the manufacturer.**

### 2.2 Connecting probe and main unit

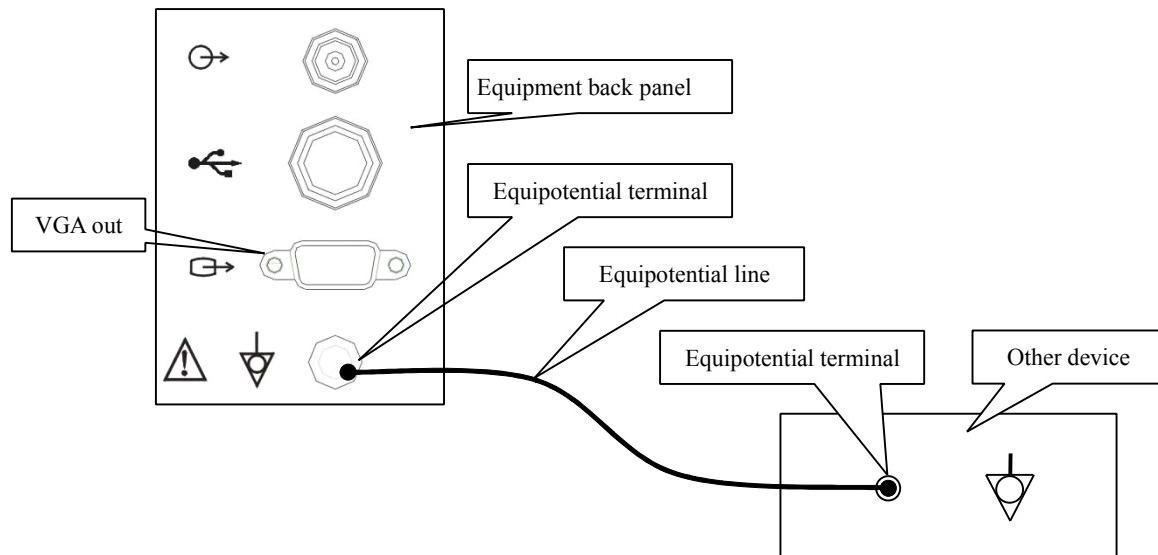
Check the power supply too see if it is in the expected range (AC100V-240V, 50Hz/60Hz), then connect the equipment and the power socket with the cable.

Connect the probe:



## 2.3 Equipotential connection

See the figure:



### Warning

**Equipotential: When this equipment is used together with other device, equipotential should be in consideration.**

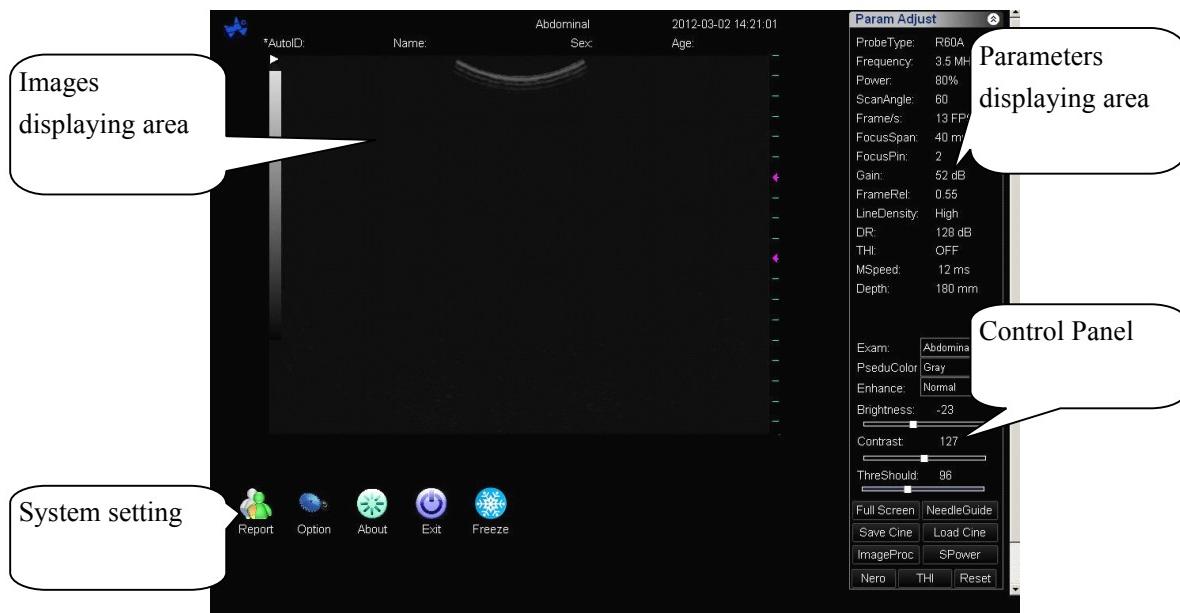
**When the equipment is in use, the doctor and patient are under the risk of uncontrollable compensating current influence, which is caused by different electric potential between facilities and tangible current carrying parts. The most safe solution is set up a united equipotential network, and connect the medical equipments with the equipotential network in the treatment room.**

## 3 Operating procedures

### 3.1 Introduction of keyboard



### 3.2 Display interface



### 3.3 Operation Procedures

1. Press button  on left side of machine to start the device;
2. Select examine type;
3. Apply medical ultrasonic coupling agent on the sound window surface of probe, press it on

scanning place, and the real time images will be displayed on screen;

4. Freeze the image, and start measuring operation on it;
5. Press **REPORT** key and input the basic information of patient, then save;
6. Press **Print** key or Click **REPORT** to generate and print reports.

## 4 Setting

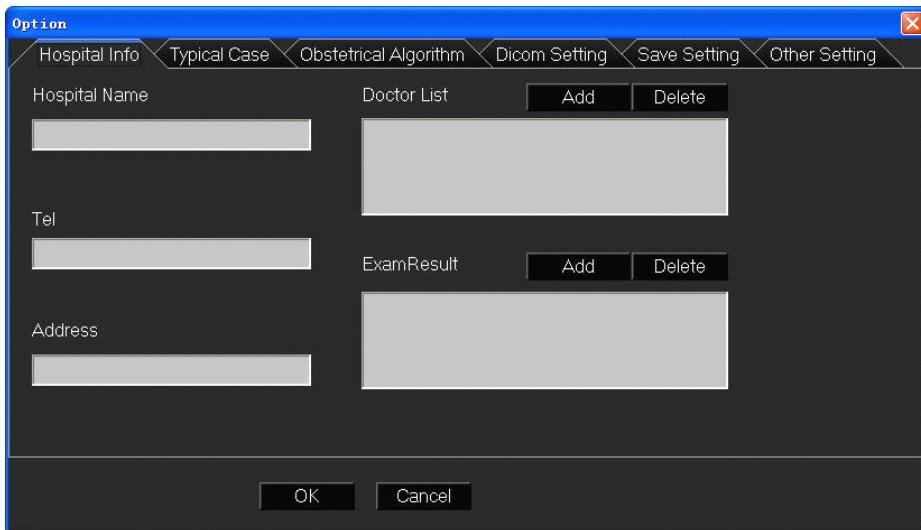
### 4.1 General



Click **Option** to open **SETTING** window, and click on upper right to close.

Setting consists of six parts: **Hospital Information**, **Typical Case**, **Obstetrical Algorithm**, **Dicom Setting**, **Save Setting** and **Other Setting**.

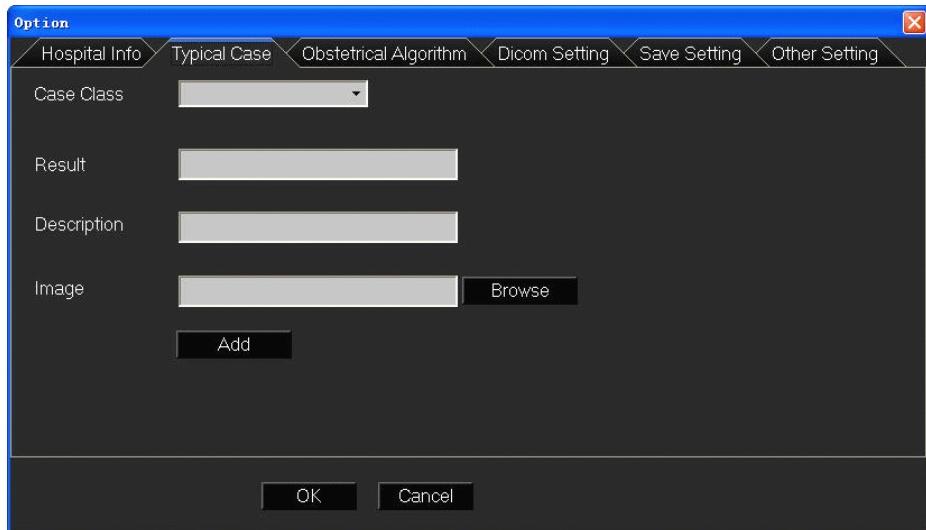
### 4.2 Hospital Information



**Hospital Name**, **Telephone** and **Address** refer to the information of examining hospital, wherein, the hospital name and telephone number will be included in the reporting page automatically.

The diagnosis doctor and examine doctor in examine file can be added or deleted via **Doctor List** here, and the examine result can be added or deleted via the **Examine Result** here.

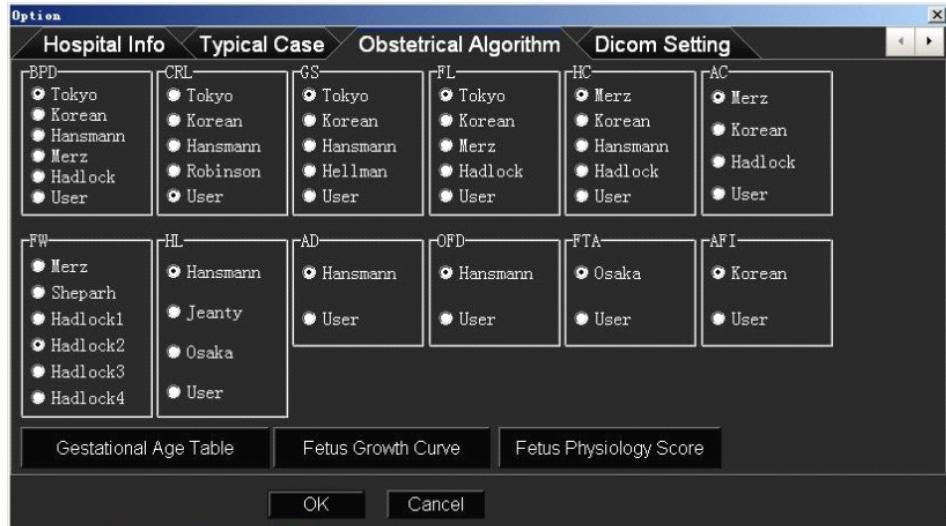
### 4.3 Typical Case



It refers to the typical cases in the original systematic examine files, which can also be manually added. Common cases encountered during examine can be added via the **Typical Case** here if the case is not included originally in the system.

Besides the categories originally included in the system such as the obstetrics and gynecology reporting form, liver, gall, pancreas and spleen lists etc., **Case Category** pull-down list also includes a **Customer Typical Case** option. Choose **Add New Typical Case** via this pull-down list to add new case under specific case category.

#### 4.4 Obstetrical Algorithm



Preset the algorithm before obstetrical measurement in this window.

Beside of modifying obstetrical algorithm presets, there are three more blocks, respectively Gestational Age Table, Fetus Growth Curve and Fetus Physiology Score.

##### Gestational Age Table:

Click **Gestational Age Table** to enter, there are mainly two parts: preset obstetrical list and user edit mode, respectively as shown in the figure below:

Please Choose AC Merz		
AC(mm)	WEEKS(w.d.)	SD(days)
56	12.1	9
58	12.2	8
60	12.4	8
62	12.5	8
64	12.6	8
66	13.1	8
68	13.2	8
70	13.4	8
72	13.5	9
74	13.6	9
76	14	9
78	14.1	10
80	14.3	9
82	14.4	9
84	14.6	9
86	15	9
88	15.1	10
90	15.3	9
92	15.4	9
94	15.5	10
96	15.6	10
98	16.1	10

Preset Obstetrical List

Please Choose AFI User		
AFI(mm)	WEEKS(w.d.)	SD(days)

User Edit Mode

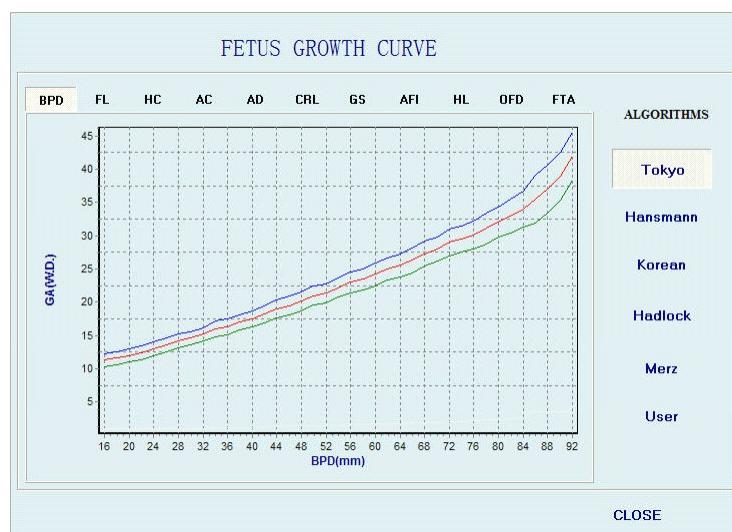
Move the cursor to corresponding obstetrical list and click, there are 31 sheets of obstetrical list, wherein, **\*\*User** refers to user edit mode, shown as follow:

BPD(Tokyo Method)	AC(Hadlock Method)	HL(Hansmann Method)
BPD(Hadlock Method)	AC(Korean Method)	HL(Jeanty Method)
BPD(Korean Method)	AC(Merz Method)	HL(Osaka Method)
BPD(Hansmann Method)	AD(Hansmann Method)	OFD(Hansmann Method)

BPD(Merz Method)	CRL(Tokyo Method)	FTA(Osaka Method)
FL(Tokyo Method)	CRL(Korean Method)	
FL(Hadlock Method)	CRL(Hansmann Method)	
FL(Korean Method)	CRL(Robinson Method)	
FL(Merz Method)	GS(Tokyo Method)	
HC(Hadlock Method)	GS(Korean Method)	
HC(Korean Method)	GS(Hansmann Method)	
HC(Hansmann Method)	GS(Hellman Method)	
HC(Merz Method)	AFI(Korean Method)	

### Fetus Growth Curve:

Click **Fetus Growth Curve** and enter, as shown in the figure below:



The system includes totally 31 types of fetus growth curves for users' reference, which can be exited by pressing **CLOSE**.

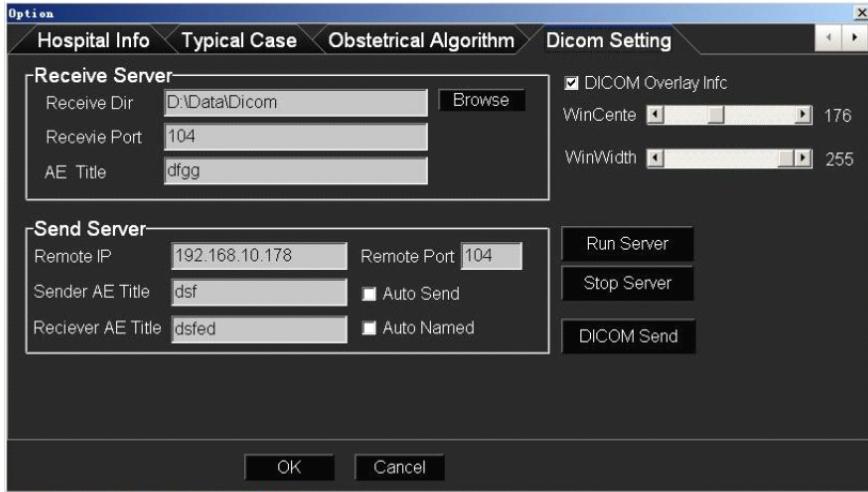
### Fetus Physiology Score:

Press **Fetus Physiology Score** and enter, as shown in the figure below:

Choose corresponding scores in the fetal breath movement, fetal movement, fetal tone and amniotic fluid index options according to physical development conditions of fetus and

press **OK**. The final Fetus Physiology Score appears in reporting pages.

#### 4.5 Dicom Setting:



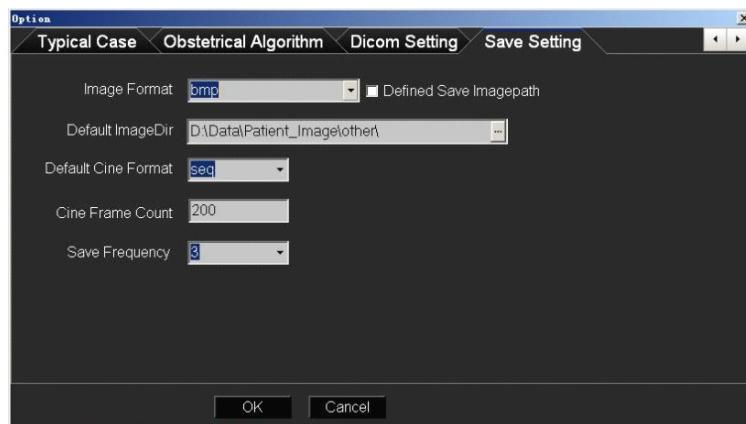
- DICOM Overlay Information is used to set whether characters information will be loaded or not during saving DICOM images.
- Window Center and Window Width is used to set up the contrast and brightness during saving DICOM images.
- When auto send  **Auto send** is checked on, the film files will be DICOM transmitted when they are being saved.
- The Dicom Transmitting function is added for pictures in the form of *.dcm* can be adjusted with its gray scale, which is helpful to doctor diagnosis.
- Dicom transmission refers to transmission of pictures in *.dcm* forms between two machines installed with Dicom protocol, and the specific settings are included in the **Dicom Setting** here. Dicom settings are required both for transmitting end and receiving end, the receiving end number and server end number must be same. (**tips: Can only transmit .DCM format images or movies**)
- Dicom transmission requires receiving end and transmitting end, this machine can be used as both. When it is used as receiving end, the received parameters can be set in receiving end setting, and the local receiving function should be started; if the local receiving is disabled, the transmitting fails. If the machine is used as transmitting end, specific settings are shown as follow:
  - 1) Set the parameters on transmitting end;

- 2) Click **Dicom**, open the interface shown as follow.



- 3) Click **Select Dicom File** and pop up the dialogue frame, then select open;
- 4) Click **Send Dicom**, send **.dcm** pictures to receiving end, and **Successfully Sent** dialogue frame pops up;
- 5) Click **Exit**.

## 4.6 Save Setting



After customer saving route is checked, the system will remind the users to select route when the images are saved every time.

It is also possible to modify default saving route, and click .

The images can be saved with optional form, including **.bmp**, **.jpg**, **.dcm** and **.tif** forms  
The film forms include **.seq**, **DCM (DICOM)** and **avi**.

Press **OK** after set.

## 4.7 Other Setting

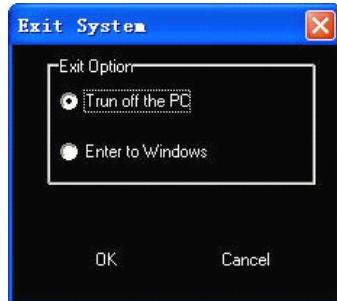


- The **SHOW** and **HIDE** on main menu, which can switch the displaying and hide
  - of Report      Option      About      Exit
- **Machine Type** can be used to set the type of machine.
- Language bar can be used to set the displaying language of entire software.
- **Backup file to Device** can be used to periodically backup files etc. to prevent data lost.

## 4.8 Exit the System



Click **Exit**, and following dialogue frame appears:



Press **Turn off the PC** to stop the device and put it into standby status;

Press **Enter to Windows** to exit B-ultrasound interface and enter into windows operation system.

## 5 Adjust Image Parameters

### 5.1 Switch Display Mode

#### Switch to Mode B

Press key **B**, the current image is switched to real time single B mode (device start default mode).

#### Switch to Mode BB

Press key **BB**, the current image is switched to double B mode, the screen displays both real time and frozen images. Press key BB again to switch the real time and frozen status of the two images.

#### Switch to B+M Mode

Press key **BM/M**, and the current image is switched to **B+M** mode, the screen displays a type B and a type M real time images at same time, and the sampling line on type B image can be moved horizontally by trackball.

#### Switch to Mode B+M/M

Under **B+M** or **M** mode, press key 4B and switch the current image to **B+M/M** mode, the screen displays a type B and two type M real time images, the two sampling lines on type B image can be moved horizontally by trackball, and press key **L/R** to switch the line to be moved.

#### Switch to Mode M

Under Mode **B+M**, press key **BM/M** to switch the current image to Mode **M**, the screen displays a type M image.

#### Switch to Mode 4B

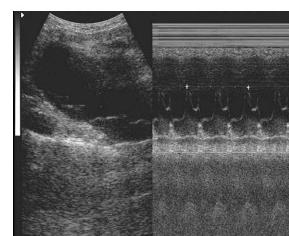
Under Mode B and BB, press key 4B to switch the current image to 4B mode. The screen displays four type B images including one real time mode. Continue to press key 4B to switch the real time and frozen status of the four images.



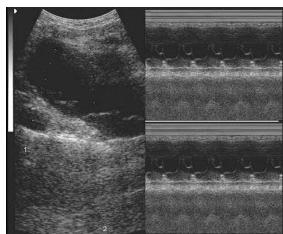
B



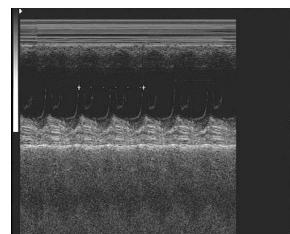
BB



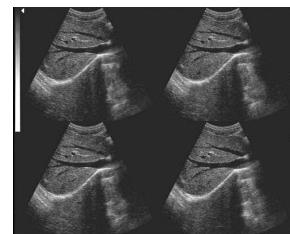
B+M



B+M/M



M



4B

## 5.2 Freeze Image

Press key **FREEZE** to switch real time and frozen status.

## 5.3 Adjust Gain

The *Total Gain*: 32dB on right side of screen is the current gain, which is adjusted via button **GAIN**. The close/middle/remote fields can be adjusted via the 8 sections of TGC on keyboard.

## 5.4 Adjust Displaying Depth

Under real time mode (non-4B mode), dial **DEPTH** up and down to change the current displaying depth (or scale). The current depth display is on right side of screen, and the adjustment scope changes along with probe type. Take the following tale for reference.

Probe Type	C3-1 Convex Array probe	L3-1 High Frequency Linear array probe	C1-6 Slight Convex probe	EC1-1 Intracavity Probe
Depth (mm)	90~250	40~105	50~125	50~125



Depth 90



Depth 180



Depth 240

## 5.5 Adjust Probe Scanning Angle

Dial **ANGLE** up and down in real time scanning status to adjust the size of angle, and take the following table for reference on probe angle.

Probe Type	C3-1 convex array probe	EC1-1 Intracavity probe	C1-6 micro convex probe
Angle	60° visible and adjustable	120° visible and adjustable	90° visible and adjustable

## 5.6 Adjust Dynamic Scope

Dial **DR** up and down in real time scanning mode to alter the dynamic scope which is from 0 to 192dB, with adjustable range at 64 to 192dB

## 5.7 Focus Adjustment

### Focus Number

Dial **FOCPIN** up and down under real time B or BB modes to switch the focus numbers, and the screen displays the current focus number such as *Focus Number: 2* on right side.

### Focus Distance

When focus is  $\geq 2$ , dial **FOCSPAN** up and down to select focus combination state, and change the size of focus distance by knob **PARAMADJU**. The current focus distance value will be displayed on right side of screen.

### Focus Position

Dial **FOCPOSI** up and down in real time scanning status to move the focus vertically and change its position.

#### Notice:

**Images near focus indicator  have better focusing. It is possible to change the focus number, position and distance to direct the focus to interested area.**

## 5.8 Probe Working Frequency

Dial **FREQUENCY** up and down in real time scanning status to switch the frequency of currently working probe, and the current working frequency will be displayed on upper right corner of screen, such as *Frequency: 35MHz*. The frequency scopes of probes are shown as follow:

C3-1 Convex Array probe —— 2.0MHz, 2.5MHz, 3.5MHz, 4.5MHz, 6.0MHz

C1-6 Slightly Convex probe —— 4.5MHz, 5.0MHz, 5.5MHz

EC1-1 Intracavity probe —— 4.5 MHz, 5.5MHz, 6.5MHz, 7.5MHz, 8.5 MHz

L3-1 High Frequency Linear Array probe —— 5.5 MHz, 6.5MHz, 7.5MHz, 8.5MHz, 12 MHz

## 5.9 Switch the Probe

When the device is connected with 2 probes, the automatically identified plug port A is default working probe after start, and the probe type is displayed on upper right corner of screen, such as *Probe: R50A*. Press key **PROBE-S** and switch to plug B, and then probe on plug B starts to

work.

**Notice:**

**Two probes can not work together.**

**Stop the device before plugging in/out the probes and restart after probes are properly connected.**

## **5.10 Frame Relative Adjustment**

Under mode B, BB and 4B, dial M Velocity/Frame Correlation and down to change frame size which will be displayed on upper right side of screen in real time, such as Frame Relative: 0.55, with adjustable scope as 0.20 to 0.95.

## **5.11 M Speed Adjustment**

Under real time B+M, B+M/M and M mode, dial **M Velocity/Frame Correlation** up and down to adjust the brush speed of type M images on screen. The current scanning speed will be displayed on left side of screen, such as *M speed: 6ms*. There are four optional gears for the device: 6mS, 8mS, 10mS and 12mS

## **5.12 Sound Power Adjust**

Under real time scanning mode, continuously click  to adjust the current scanning sound output power.

**Notice:**

**Ultrasonic waves may do harm to human body, and long time radiation with high power must be avoided. Be careful when using the function. The probe may heat up when the power of ultrasonic wave is added.**

## 6 Image Processing and Adjustment

### 6.1 Tissue Harmonic Image

During real time scanning status, continuously click  to enable/disable tissue harmonic image. Tissue harmonic weave status will be indicated on right side of screen: *Tissue Harmonic: ON*.



Able Tissue Harmonic



Disable Tissue Harmonic

#### Notice:

**Tissue harmonic is only valid under abdomen probe.**

### 6.2 Pseudo-color Treatment

Click  in right side of  to alter the current false color value, there are totally 10 types of false color settings.  on the lower part is used to set the threshold of false color, drive the slide block or click  to adjust.

### 6.3 Image Enhancement

Click  in right side of  to select image enhancing function, there totally 8 statuses optional.

### 6.4 Full Screen Displaying Image

Click , the image is displayed in full screen, and press key **R** to exit.

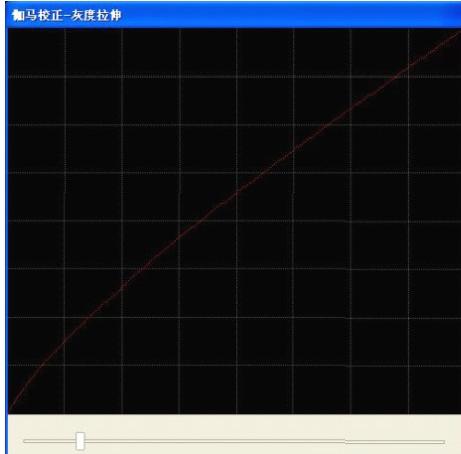
### 6.5 Brightness and Contrast Adjustment



The  on right side of screen corresponds to brightness and contrast adjustment slide blocks, drive the slide block or click  to adjust

## 6.6 GAMA Calibration

Sequentially click **ImageProc** → **GamaAdjust** to enable the function. The screen displays as following frame:



Directly drive The slider to adjust GAMA value.

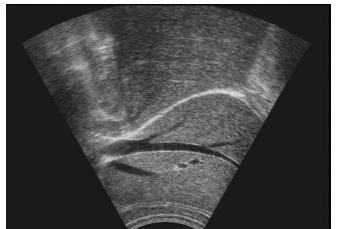
### Notice:

**GAMA calibration may be required to normally display images for externally connected display.**

## 6.7 Image Turnover

### Turning Over Up and Down

Dial **U/D** up and down to turn over the image up and down.



### Turning Over Lift and Right

Under B or BB mode real time scanning status, dial **L/R** up and down to turn the image over left and right. The ▶ on upper left side of screen is the image scanning direction indication.



## 6.8 Histogram

After image is frozen, sequentially click **ImageProc** → Histogram to display histogram.

## **6.9 Local Amplification**

Press key **ZOOM**, and move cursor to image area, the cursor changes to 【+】. Press mouse left and select area via trackball, then the image of the area is amplified and displayed in the center of screen, which can be moved by trackball. Press key **ZOOM** again to exit local amplification.

Press **ZOOM** and adjust knob **ParamAdju** to amplify or shrink the image, and the amplified rate is indicated on upper left side of image in real time. The range of rate is Zoom in: 1.1~Zoom in: 5.0. Press **ZOOM** to exit.

## 7 Note

### 7.1 Note in Full Screen

Press key TEXT, Input note content and then click anywhere in image area to finish noting.

Press ← to delete wrongly input words.

Press Ctrl+Shift to shift input method.

In order to move the note content, click it on screen until it becomes green and cursor changes to direction icon, and then move the content and click again.

To delete a comment content, Press right key to choose the comment content, Then press Delete.

### 7.2 Body Sign Setting

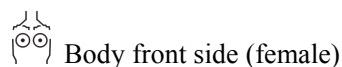
Sequentially press key **BODY** → BodyMark, and body signs are indicated on right side of screen.

Click corresponding icons to show body signs on lower right corner or screen. Following is brief introduction to partial body signs.

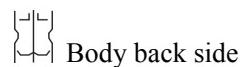
1. Abdomen:



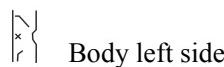
Body front side (male)



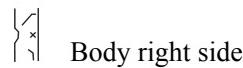
Body front side (female)



Body back side

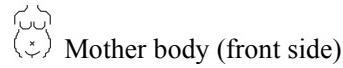


Body left side



Body right side

2. Obstetrics

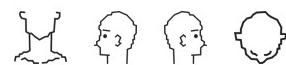


Mother body (front side)



Fetus

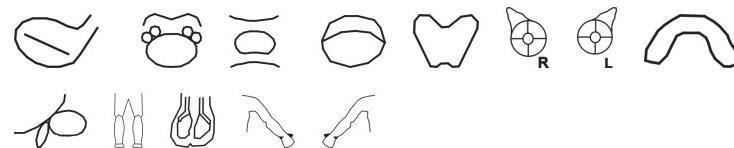
3. Head:



4. Heart:



5. Others:



Sequentially press **BODY** → **Remove BodyMark** to delete body signs.

### **7.3 Input Arrow**

Sequentially press **BODY → Arrow**, the cursor changes to +. Click anywhere in image area, and drive the arrow to expected length, and lick again to input arrow. Repeat to make more arrows.

### **7.4 Clear Screen**

Press **CLEAR** to clear the measuring mark, notes and body signs etc. information in image area.

## 8 Images and films

### 8.1 Save Static Images

Images can be saved in **.bmp**, **.jpg**, **.dcm** and **.tif** forms, see details in **Save Settings**.

Pictures in **.dcm** form can be adjusted with gray scale, which is helpful for doctor diagnosis.

#### Operation Procedures:

1. In real time or frozen status, continuously press key GRAB to save the current image in memory. Image preview window is indicated on right side of screen, and 5 current images can be saved at max.



2. Click **Report**, and sequentially click **New** → **Save** to build a new personal document;



3. Select examine type in examine file column, and then click **Save** to pop up dialogue frame



**Save New Record or Not**, select **YES**, and click **Cancel** to exit case information window;

1. After operations above, the saving route of saved image is:

*D:\Data\Patient-Image\Year-month\Year-month-day\Case Number-Patient name\*

For example: if a patient named Lily was examined in Nov. 10 in 2009 with her case number as 1, then the saving route of saved image is:

*D:\Data\Patient-Image\2009-11\2009-11-10\1\_Lily.*

#### Notice:

**Restart the software and save image, the images saved last time will be covered.**

- Double click in the menu **Image Preview** on right side of screen to open the image, wherein, images in **.dcm** form can be adjusted with gray scale. Press **FREEZE** and return to current active status.
- Right click in the menu **Image Preview** on right side of screen to select **CLEAR** and selected image is removed. It is also possible to clear all.

### 8.2 Film Replay

- After startup and entered into real time scanning status, the device collects the current images into memory, and press **FREEZE** after about 30S to freeze the image.
- Press knob **Play/Pause** to start film replay, the images will be displayed in cycle. Current replay status is displayed on lower right corner of image, for example: **Frame 0-XXX/XXX**, respectively represent current frame and total frame number.
- Please press knob **Play/Pause** to suspend replay, and adjust the knob to realize single frame reply. Press again and switch back to automatic recycling replay status. Press key **FREEZE** and return to current active status.

### 8.3 Saving Films

Film saving forms: the films can be saved in **.seq**, **DICOM** and **AVI** form. **See Saving Settings for detail.**

Film saving route:

Click **Save Cine** to pop up saving route selection dialogue frame.

**Notice:**

**Please do not try other operations during film saving**

## 8.4 Loading Films

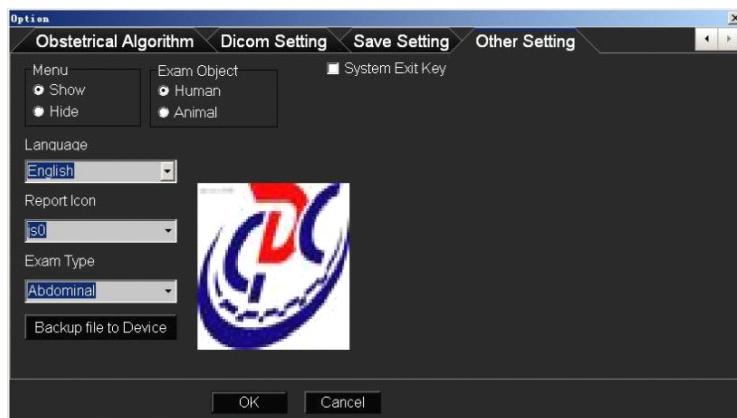
If there are film files on hard disk, choose **Load Cine** in right menu, and select corresponding file in dialogue frame popped up. Click open button to display automatically.  
(Note the file type)

If film files in DICOM form are loaded, press left button in image area, and move trackball to set image brightness

## 8.5 Data Backup



Start software, and plug in movable device (for example U disk). Click **Option** and select **Other Setting** to enter into following interface:



Select **Backup file to Device** to copy the **Typical Case, Setting Files, Saved Images and Data Base** (patients' information) to movable device and backup.

**Notice:**

**In order to prevent data lost, please ensure to backup patients' information before replacing hard disk or upgrade/resume system.**

## 8.6 Import Patient Information

**Notice:**

**Before importing, ensure the patients' information is backed up according to 8.5.**

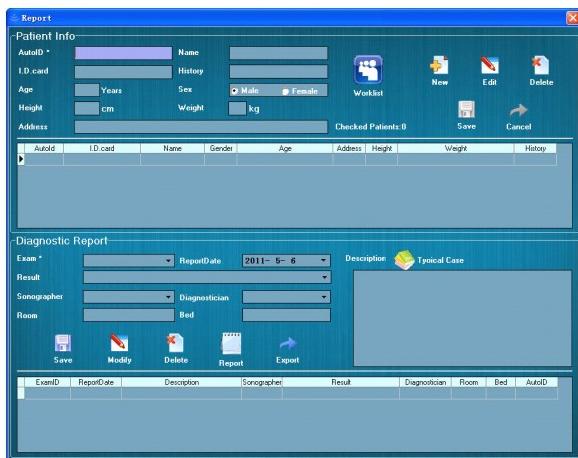
**Since *Welld.mdb* files include all the word information of patients, these files refresh every**

**time a patient's file is newly added or existed case is modified. So consider twice before importing patients' information.**

1. Without replacing hard disk, all the data in windows disk D will remain unchanged after the system is upgraded or resumed, the data in disk D will be recalled after repeated upgrade/reset. Under such condition, the patients' information is not required to be imported or resumed. If it is needed, ensure there is no newly added case or case data is unchanged after backup, and then import information (with following method). Otherwise, the modified or newly added data will permanently lost unless you do not need them, please do remember this!
2. When the hard disk is replaced or formatted, backup patients' information needs to be imported: First resume the system, and then copy the corresponding Data files (Typical case or Setting), saved images and data base (patients' information) in disk or movable memory device to windows disk D and cover original files, then enter into B-ultrasonic system. Press



**REPORT** on keyboard or click **Report** on main interface to enter into file interface, shown as follow.

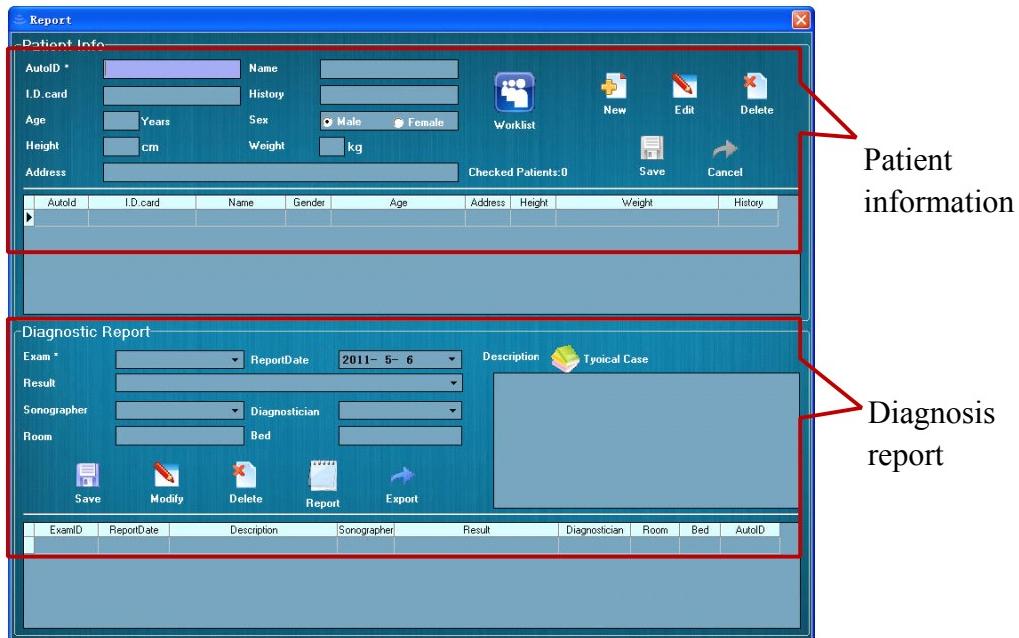


At this time, **Search, Modify, Delete** and **Print** etc. operations are available.

# 9 Case Management and Report

## 9.1 Open/Close Files

- Click  on main interface and enter into file interface, shown as follow.



- Click  on upper right corner of file window to close file window.

## 9.2 Inquire Files

- Open file window, the inquiry status is systematically defaulted.
- The system allows inquiry to relative files via numbers, names and ID. Input inquiry content in numbers, names and ID frames, and press the key **ENTER** on standard PC key board.
- Beside of inquiring word documentary information, when one of the diagnosis reports is clicked, the system will also load on the saved images correspondent to the report, and the details are shown in the drawer menu **Image Preview** on right side. If the report is printed, then the first two images are printed (in the order of saving).

## 9.3 Add New File

- If the patient's information is not included in data base, it needs to be added.
- Newly built files are mainly composed of two parts: newly built patient information and newly built diagnosis report. The patient information must be established before diagnosis report. See the details as follow:
  1. Build new patient information (method 1):



- 1) Click  and serial number is automatically added.
- 2) Input other relative information in patient information part.



- 3) Click **Save** to confirm if the newly built patient information needs to be saved; click **Cancel** to cancel the new patient information.
  
2. Build new patient information (method 2):
  - 1) Under this method, it needs to provide a port to another PC, and then the patient registered on the other PC will be indicated in working list.
  
- 2) Click **Worklist** to open working list window, shown as follow:



- 3) It is mainly composed of two parts: Working List and Current Examines, the Current Examine will sequentially indicate the waiting patients in Working List.
  
- 4) Click **Exam Current** and add the basic information of patient currently examined into Patient Information.
  
3. Build new examine file: the following procedures are executed on the premise that the newly built patient information is confirmed to be saved, otherwise they are not to be executed.

  - 1) Fill relative information of examine file.



- 2) Click **Save** to confirm and save.

#### **Notice:**

If the examine result is included in the typical cases, then open the **Tyoical Case** on right side, double click existed description and directly import current examine file.



Press **Export** to import current examine file into Typical Case.

Select one item in typical cases list and right click, choose **DELETE** to remove it. The typical cases originally existed in the system can not be removed.

The report date is current date, which can be modified by clicking down arrow.

- Multiple examine files (i.e. diagnosis report) can be added to the same *Patient Information*.

## **9.4 Modify Files**

- If a file is included in data base, which needs to be modified with some content, then choose Modify File.
- There are mainly two parts needed for modifying a file: modifying patient information and

modifying diagnosis report. See the details as follow:

1. Modify Patient Information
- 1) Recall the file needs to be modified by Inquiry File.



- 2) Click **Modify**.
- 3) Modify relative content in patient information.
- 4) Click **Save** to confirm if the modified content needs to be saved, and click **Export** to cancel the modification.

  2. Modify Examine File:
  - 1) Recall the file needs to be modified via Inquiry File.
  - 2) Modify the relative content in the file.

- 3) Click **Modify**, there is a dialogue frame **Modify Current Diagnosis Report or Not**, click **YES** to confirm the modification, and **Successfully Modified** window pops up.

## 9.5 Delete File

- Some files in the data base that are not needed any more, such files can be deleted.
  - There are two conditions in deleting files: deleting *Patient Information* and deleting *Diagnosis Report*. The entire file is deleted when *Patient Information* is deleted. When *Diagnosis Report* is deleted, only one of the diagnosis reports under the *Patient Information* is deleted.
1. Delete Patient Information:
    - 1) Recall the file needs to be deleted by Inquiry File.
    - 2) Click **Delete** and dialogue frame **Confirm to Delete Current Patient Information** appears, then click **YES** to confirm deletion.
  2. Delete Diagnosis Report:
    - 1) Recall the file which contains the diagnosis report needs to be deleted.
    - 2) Select the diagnosis report needs to be deleted via trackball and light mouse.
    - 3) Click **Delete** and dialogue frame **Confirm to Delete Current Diagnosis Report** appears. Click **YES** to confirm deletion.

### **Notice:**

**Keys ADD, MODIFY, DELETE, SAVE and CANCEL are available when they are colored, and invalid when they are gray.**

## 9.6 About Report

- Report form will be automatically indicated according to the examine type in **Files → Examine File**.
- Routine measurement will not be included in report page.

- Report will add pages automatically according to measured items, in order to ensure the information on report page is fully indicated.

## 9.7 Report Form

- There are six parts in report, with details as follow:
  1. Report single title: hospital name + colorful Doppler ultrasound examination report form.
  2. Basic information of examined patient: including examine type, examiner number, name, gender, age, room number and bed number.
  3. Image displaying area: saved image will be displayed here, with two images at max.
  4. Measuring value record: composed of measuring parameter and measuring value.
  5. Clinical content: including clinical symptoms and clinical diagnosis conclusion.
  6. Basic information of examine unit: including examine doctor, report doctor, examine date, Tel and examine unit (stamp).
- See the following report forms on following pictures for detail.

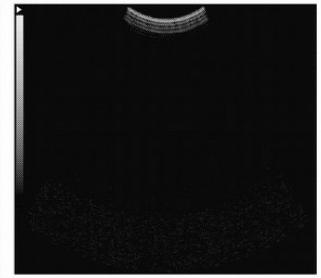
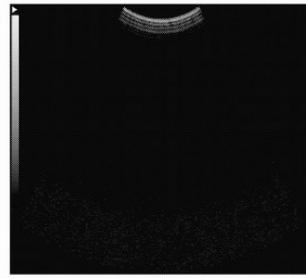
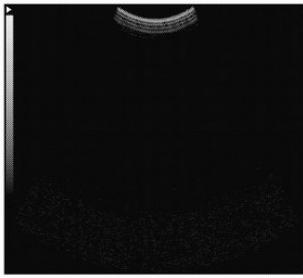
## 9.8 Print Report

- Selected the corresponding check the file before printing, then click "**Print**" button to print.
- If you created a report, Press the "**Print**" to print the report.

## B-UltraSound Inspection Report

Exam: Obstetrical PatientNo: 1

Name: gender: Male age: RoomId: BedId:



LastCatamenia 2011-5-6  
ChildBirth 2012-2-5  
FBM 0  
FM 0  
JZL 0  
AFIGrade 0  
TotaGrade 0

### Clinical:

### ExamResult:

Clinician: ReportDoctor: ExamDate: 2011-5-6  
TEL: Department(Stamp):

Only as a reference not as proof

# 10 Measurement

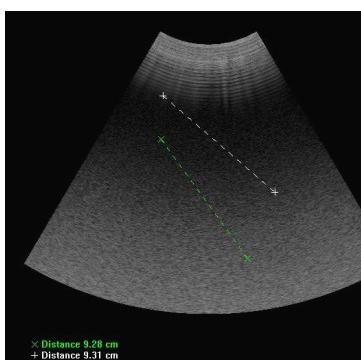
## 10.1 General

- The device can give multiple measurements to multiple items, with six measuring marks: +, ×, △, □, ◇ and ○.
- The device provide more than 10 measuring items, including **Heart, Gynecology, Obstetrics, Vessel, Hip, Urological, Abdomen, Fetus Heart, Prostate Gland, Kidney, Neck Artery, Thyroid Gland** and **Vein**. Adjust knob **EXAM** to select corresponding examine type, and press key **MEASURE** to enter.
- Press key **MEASURE**, system automatically enter into measurement status under current examine type and displaying mode, it also displays measuring menu.

## 10.2 Routine Measurement

### 10.2.1 Distance Measurement

1. Choose examine type as abdomen and press key **MEASURE** to sequentially select **GENERIC → DISTANCE** on right side of screen;
2. Move icon + to start point by trackball, and left click to confirm;
3. Move icon + by trackball and click left to confirm, at this time the cursor changes to single arrow, and the measuring value is automatically displayed on lower left corner.
4. Adjust measurement: move the cursor via trackball near to start/end point, press mouse left when the icon becomes hand form, and move trackball to adjust. Press left key to confirm after adjustment.
5. If it needs to continuously measure multiple groups of distance values, move the cursor to start point by trackball and left click to confirm. At the same time, cursor changes into cross icon +, and then repeat step 3.



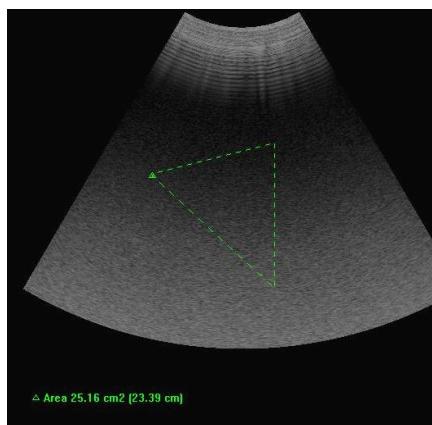
Distance Measurement Diagram

### 10.2.2 Area Measurement

#### Trace Method:

1. Select examine type as abdomen, and press key **MEASURE**. Sequentially select **GENERIC** → **AREA** → **Trace** on right side of screen;  
The icon is a black square containing a blue star-like shape with four points.
2. Move cross icon + to start point by track ball and click left;
3. 1) Drive icon + to another point and click left to confirm, repeat the operation and click

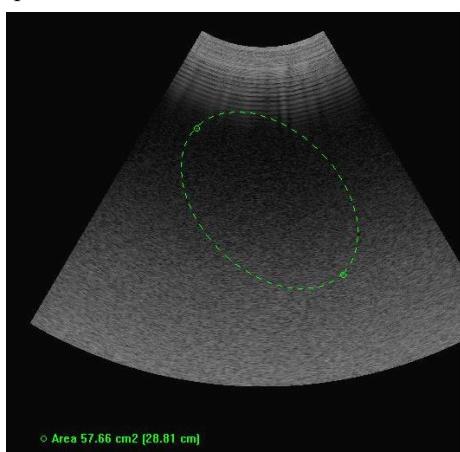
- right finally to end measurement, the measured value will be displayed on lower left corner;
- 2) Press left key and directly drive the cursor, finally release left key and press right key to finish the measurement;
  4. Repeat step 1 to 3 to continuously measure multiple groups of area values.



Area Measurement Diagram  
(Trace)

#### **Ellipse Method:**

1. Select examine type as abdomen, and press key MEASURE. Sequentially select GENERIC  
→ AREA →  on right side of screen;
2. Move cross icon + to start point by track ball and click left;
3. Move cross icon + until ellipse trace appears, drive to proper position and click left to confirm the other point. At this time the cursor is still cross icon, and drive the icon to alter the size of ellipse and finally press left to end the measurement. Measured value is indicated on lower left corner;
4. Click the nodes or arc of ellipse with cursor, move trackball and press left key to change the size of ellipse;
5. If it needs to continuously measure multiple groups of area values, move the cursor to start point and click left to confirm, the cursor becomes cross icon, and repeat step 3 and 4.



Area Measurement Diagram  
(Ellipse)

#### **10.2.3 Circumference Measurement**

##### **Trace Method:**

1. Select examine type as abdomen, and press key MEASURE. Sequentially select GENERIC



- CIRCUMFERENCE → on right side of screen;
2. Move cross icon + to start point by track ball and click left;
  3. 1) Drive icon + to another point and click left to confirm, repeat the operation and click right finally to end measurement, the measured value will be displayed on lower left corner;  
2) Press left key and directly drive the cursor, finally release left key and press right key to finish the measurement;
  4. Repeat step 1 to 3 to continuously measure multiple groups of area values.

#### **Ellipse Method:**

1. Select examine type as abdomen, and press key MEASURE. Sequentially select GENERIC
- 
- CIRCUMFERENCE → on right side of screen;
2. Move cross icon + to start point by track ball and click left;
  3. Move cross icon + until ellipse trace appears, drive to proper position and click left to confirm the other point. At this time the cursor is still cross icon, and drive the icon to alter the size of ellipse and finally press left to end the measurement. Measured value is indicated on lower left corner;
  4. Click the nodes or arc of ellipse with cursor, move trackball and press left key to change the size of ellipse;
  5. If it needs to continuously measure multiple groups of area values, move the cursor to start point and click left to confirm, the cursor becomes cross icon, and repeat step 3 and 4.

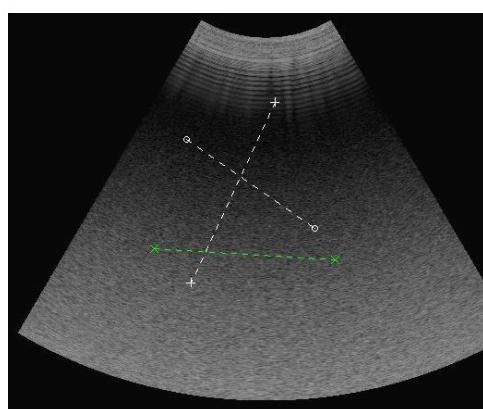
#### **10.2.4 Angle Measurement**

Select examine type as abdomen, and press key MEASURE. Sequentially select GENERIC → Angle, Click at three points in the picture with the trackball, then the angle value shaped from the three points will be displayed on the left side of the screen automatically.

#### **10.2.5 Volume Measurement**

The volume is measured in three axis method. Continuously measure three groups of distance values according to distance measuring method above, and the system automatically calculate the volume and indicate it on lower left corner.

Shown as follow:



Volume Measurement  
Diagram

### 10.2.6 Other Measurements

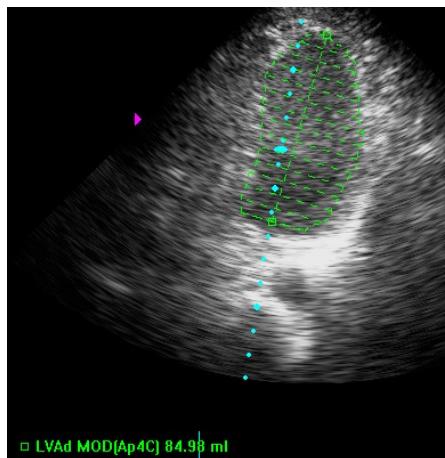
- Distance narrow rate measurement: continuously measure two groups of distance values and the system automatically calculate distance narrow rate and indicate it on lower left of image.
- Area narrow rate measurement: continuously measure two groups of area values and the system automatically calculate area narrow rate and indicate it on lower left of image.

### 10.3 Heart Measurement under Mode B



- The operation method of Volume, Circumference and Area in the measurement items above is:

Left click and move the trackball to trace out the measuring are, click left again and the measured value is automatically indicated on lower left of image. Shown as follow:



- See routine measurement for the operation methods of other measurement items.

## 10.4 Measurement under Mode M

### 10.4.1 Overview

Generic  
FastMeasure  
Ao / LA  
Valves

- Heart measurement totally includes four parts under Mode M, and they are respectively:

HR	LV	AV R-R interval
Slope	AV	AV Cusp
Time	MV D-E	MV D-E
Distance	PV	TV D-E
	TV	MV E-F slope
		MV EPSS
		MV excursion

- The measurement methods of Aorta Root Diameter, Left Atrium Diameter

Ao Root Diameter  
LA Diameter  
MM R-R interval

in Aorta Valve Cusp, Mitral Valve D-E Average, Tricuspid Valve D-E Peak

AV R-R interval  
AV Cusp  
MV D-E  
TV D-E  
MV E-F slope  
MV EPSS  
MV excursion

Value, R-R Interval, and Mitral Valve Open Diameter in are similar.

The specific measuring procedure is: move the cursor by trackball to start point and click left to confirm, drive the trackball until vertical dotted line appears, and left click to end measure.

#### Notice:

**Move the Start/End Point: if it is needed, move cursor to start/end point, and then the cursor changes to hand form. Left click, move the start/end point to proper position and click again to finish measure.**

**Repeat Measurement: directly measure if it needs, and there is no need to reselect measurement items on right side.**

HR  
Slope  
Time  
Distance

- Measurement methods of Slope, Time and Heart Rate in Cardiac Cycle under

Ao Root Diameter  
LA Diameter  
MM R-R interval

aorta M type sampling in Aorta Valve R-R Interval, and Aorta Valve E-F

AV R-R interval  
AV Cusp  
MV D-E  
TV D-E  
MV E-F slope  
MV EPSS  
MV excursion

Slope in are similar.

The specific measuring procedure is: move the cursor by trackball to start point and click left to confirm, drive the trackball until vertical line appears, and left click to end measure.

#### Notice:

**Move the Start/End Point Line: if it is needed, move cursor to start/end point, and then the cursor changes to hand form. Left click, move the start/end point to proper position and click again to finish measure.**

**Repeat Measurement: directly measure if it needs, and there is no need to reselect measurement items on right side.**

### 10.4.2 Heart Rate Measurement

Heart rate is based on two periods of cardiograms, and measured in following steps:

1. Select examine type as Heart, acquire satisfactory image and freeze under mode B/M or M, sequentially press **Measure → Generic → Heart Rate;**
2. Move cursor by trackball to start point and left click to confirm until vertical line appears;
3. Move trackball until another vertical line appears, and left click in proper position to finish measure.

### 10.4.3 Time Measurement

1. Select examine type as Heart, acquire satisfactory image and freeze under mode B/M or M, sequentially press **Measure → Generic → Time;**
2. Move cursor by trackball to start point and left click to confirm until vertical line appears;
3. Move trackball until another vertical line appears, and left click in proper position to finish measure.

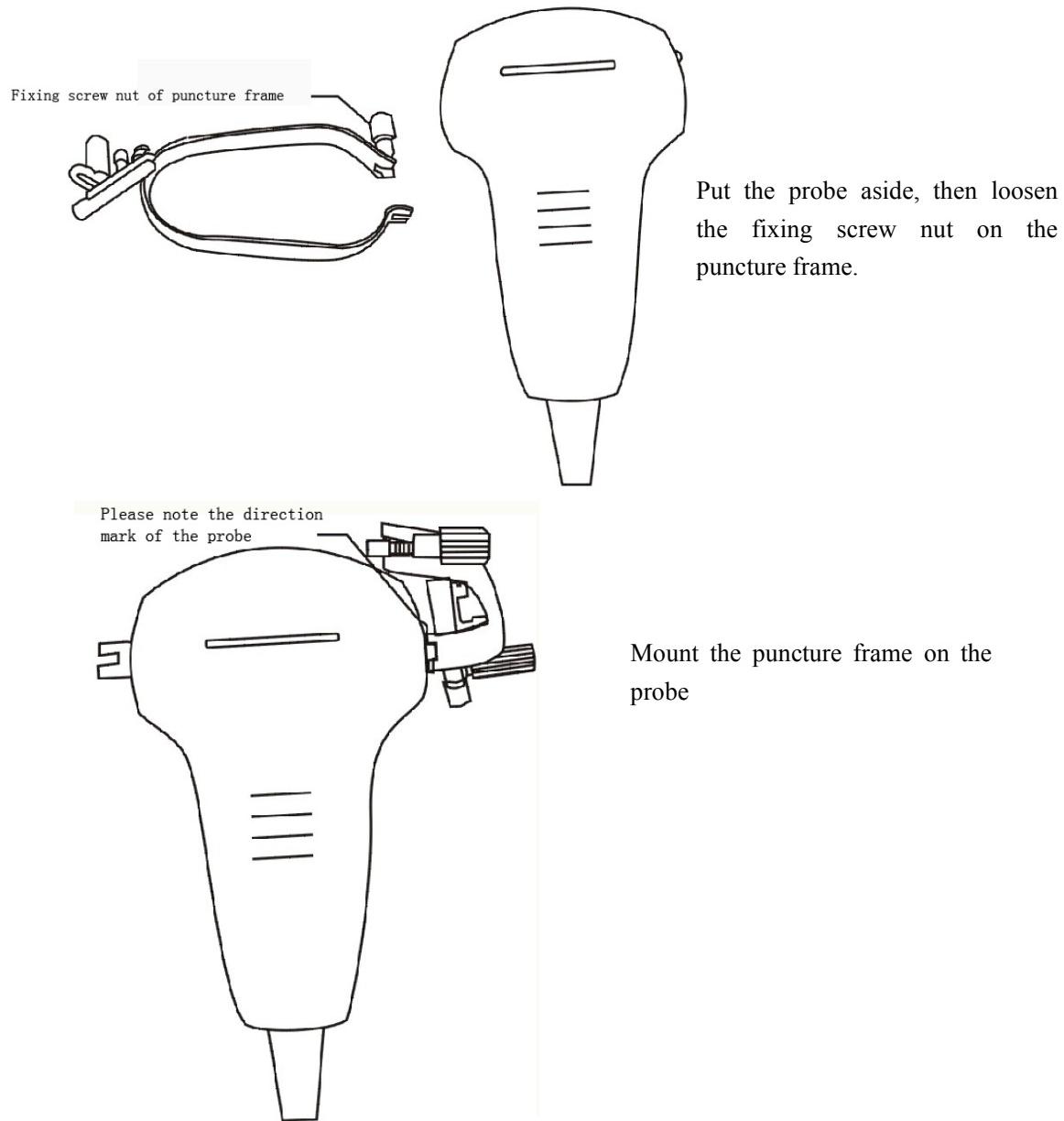
Take the process above as reference for measuring other items.

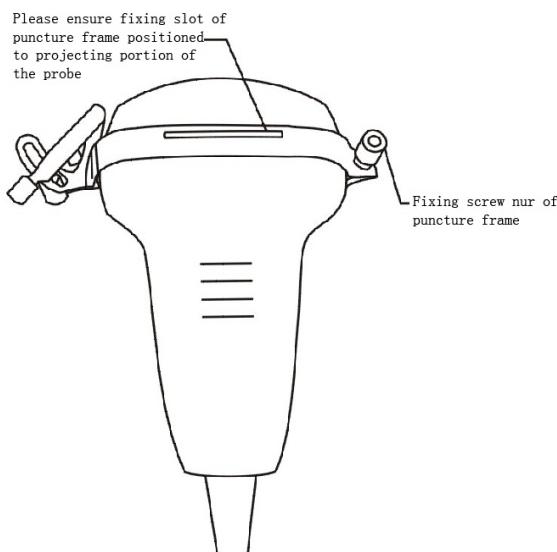
## 11 Operating Instruction for Function of Puncture Guide

### Warning:

The puncture guiding line must be calibrated before performing a new puncture .If the puncture needle is not consistent with the puncture guiding line , please do not perform the puncture operation.

It is with risk when performing the puncture guided under ultrasound, thus it should be operated by operators with the proper qualification and capability ,and the preparative work before operation such as examination of clotting time ,BPC,electrocardiogram, blood pressure, sterilization of puncture set and puncture probe and signing of operation agreement should be done strictly.

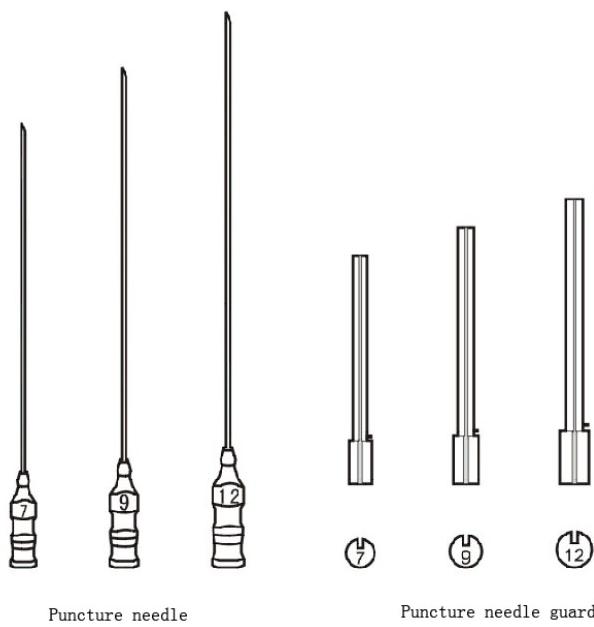




Buckle on the puncture frame and turn over the probe , then fasten the fixing screw nut of the puncture frame

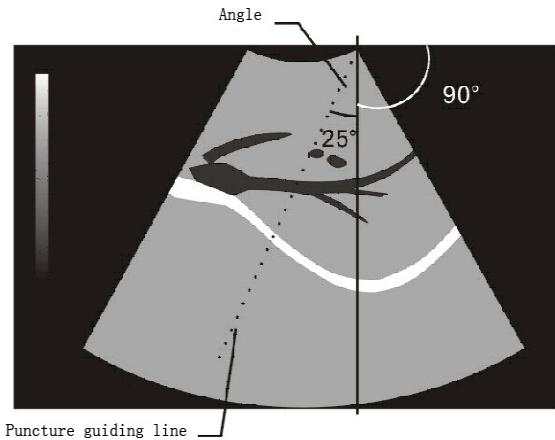
## 11.2 Selection of Puncture Needles

The puncture needles can be divided into 3 specification numbers such as No.7, No.9 and No.12. You can choose the proper puncture needle and needle guard based on the practical need. Please ensure that the specification number of selected puncture needle should be consistent with the selected needle guard.

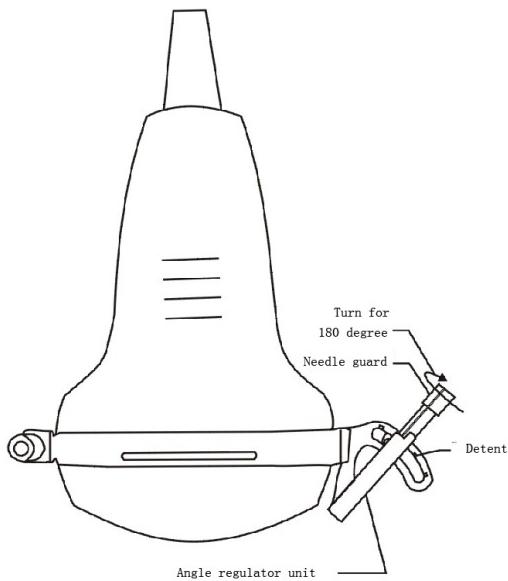


## 11.3 Call out the Puncture Guding Line

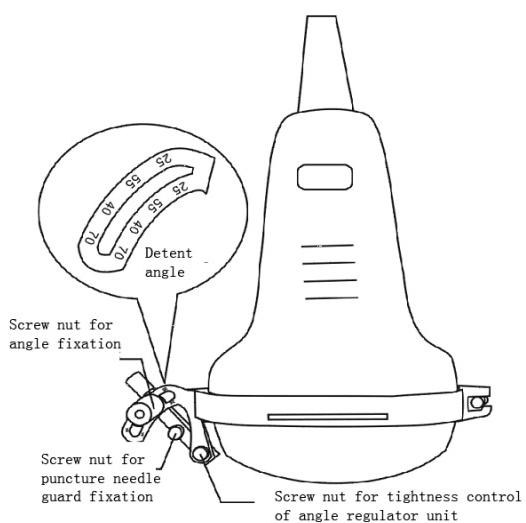
Under mode B real time scanning status, click **NeedleGuide** on right side of screen to call out needle guide line. Continuously left click to adjust the angle ( $25^\circ$  ,  $40^\circ$  ,  $55^\circ$  and  $70^\circ$  ) of needle guide line until exit.



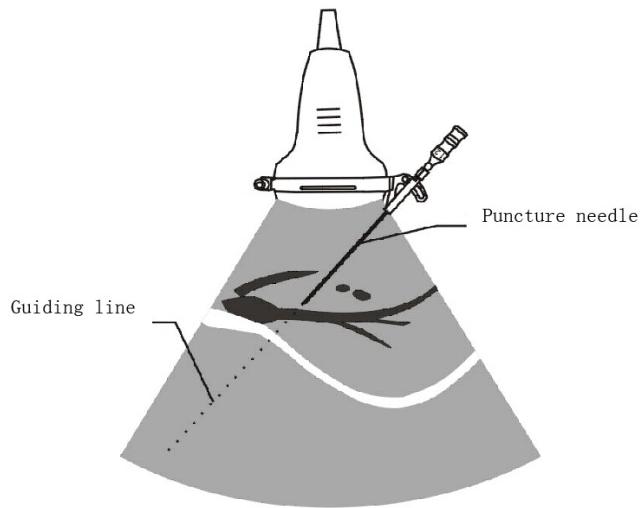
**4.4 Calibration of Puncture Line**



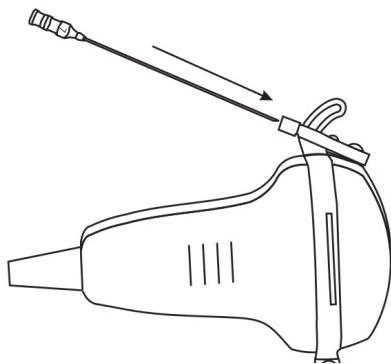
Fix the selected puncture needle on the angle regulator unit, then turn the puncture needle guard in ward for 180 degree. Thus the puncture angle can be adjusted by the angle regulator unit on the puncture frame



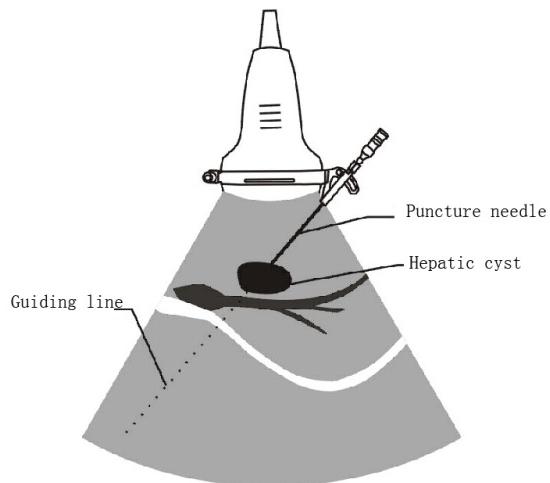
Please ensure that each type of angle should be identical with the detent (Detent Angle: 25°, 40°, 55°, 70°). The puncture needle angle should also be identical with the angle of puncture guiding line



### 11.5 Insertion of Puncture Needle

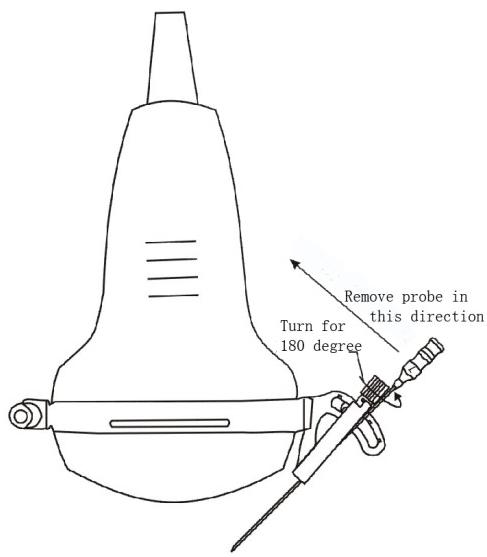


Please ensure that the tissue for puncture is on the puncture guiding line first. Then adjust the angle and insert the puncture needle slowly in the direction of needle guard



Please do not move the probe when inserting the puncture needle for ensuring the accuracy of the puncture operation

## 11.6 After Puncture



Turn the puncture needle guard outward for 180 degree to make the rabbet of the puncture needle guard outward ,then remove the probe from it

Press “Cancel” or “Clear” key to exit the puncture guiding line

## **12 Check and Maintenance**

### **12.1 Service life**

Bases on the manufacturer's design, production related files, this model's use life is six years. The Product's material will gradually aging, if the product continually use over the designed use life, it may bring the problem of the performance reduced and fault rate raise.

#### **Note:**

**The Discard the device according to local law.**

**Do not discard it mixing with other household garbage.**

#### **Warning:**

**The manufacturer shall not assume the responsibility of risks caused by using the device beyond its service life.**

### **12.2 Main unit maintenance**

- Instrumentation environment should accord with "Operation environmental requirement".
- If device enclosure needs cleaning, shutdown the device first and then wipe with alcohol sponges.
- Device should not turn on and off frequently.
- When the device does not work for a long time, pack the device according to the instructions on the packing. Store it properly in the warehouse. The storage environment should accord with "Transportation and storage environmental requirements".

#### **Caution:**

**Please refer to instructions prescribed by the manufacturer closely when using detergents.**

**Be careful with cleaning of the display, because it is very easy to scratch and spoil.**

**Please wipe it with dry soft cloth.**

**Please do not clean the inner base of the device.**

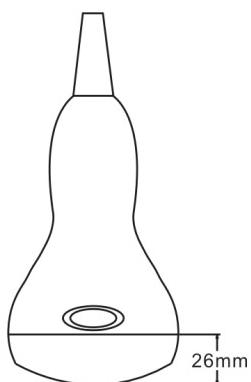
**Please do not place the device in liquid.**

**Do not leave any detergent on the device surface.**

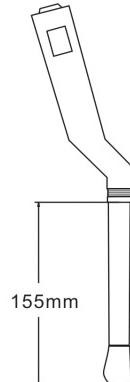
**Though there will be no chemical reaction between the device enclosure and most of those detergents, We still suggest no detergent in cleaning lest the device surface is spoiled.**

## 12.3 Probe maintenance

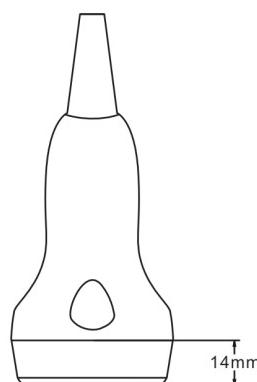
- Probe is an expensive and frangible part. Never hit it or drop it on floor. When diagnoses pauses, put the probe in its case and press  key to keep it in a state of "Frozen".
- See to use medical ultrasound coupling gel during diagnosis. Degree of protection against harmful ingress of water is IPX7. For the probes, water should not immerge over the probe acoustic window (refer to figure). Regularly check the probe enclosure to ensure it is good incase liquid ingestion spoil the inner components.



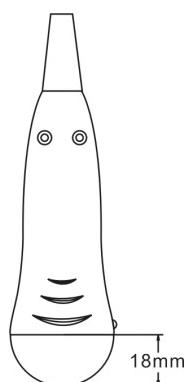
C3-1/C5-1



EC1-1



L3-1



C1-6

- Probe and host machine once tie, be request not to take down at will, for fear probe pin and socket's contract badness.

### Note:

**Probe might be damaged due to long time covered coupling gel.**

**Clean the probe head after every use.**

**Do not clean the probe with a surgical brash neither soft brash. Only soft cloth can be used to clean it.**

**Do not press the probe on the patient too long to avoid discomfort.**

### Warning:

**Must not use extender, ethylene oxide or any other organic solvent which tend to deface the probe's protective foil.**

**Must not place the probe in liquid or detergent.**

**Must keep the equipment or probe from any type of liquid's infiltration.**

**Must not clean device or probe by airing or heating.**

## **12.4 Correct usage of probe**

In order to prolong probe's service life and obtain optimum performance, follow these instructions:

1. Periodic inspection on probe cable, socket and acoustic window.
2. Shutdown the device first and then connect or disconnect the probe.
3. Do not drop probe or flint body, and never hit the probe acoustic window, otherwise probe should be damaged.
4. Never heat the probe.
5. Never bend or pull probe cable, otherwise the internal connection should be broken.
6. Use couplant only on probe header and then clean probe.
7. Inspect probe acoustical window, enclosure and cable seriously after probe cleaning. Never use the probe again if any crack or breakage is found.

## **13 Simple Trouble Shooting**

### **13.1 Check**

- Check if the power supply is ok or not, main unit power cable is connected well or not. When the supply voltage surpasses the equipment specified voltage range (AC100V-240V, 50Hz/60Hz), must not switch on the equipment.
- Check if the probe and main unit are connected well or not.
- Check power cable and probe lines regularly and replace the damaged or broken one if found.

### **13.2 Simple trouble shooting**

No.	Malfunction phenomena	Troubleshooting
1	Open power switch of the device, with no signal appeared on the screen and the indicator light is not on.	1. Examine power supply; 2. Examine supply line and plug; 3. Examine whether the fuse is burned-out; 4. Examine the lightness adjusting knob of the monitor.
2	Discontinuous striae and snow appear on the screen.	1. Examine power supply: strike fire interfere of the other devices; 2. Environmental examination: Electric and magnetic field interfere; 3. Examine power and probe plugs: whether they are well connected.
3	Unclear image display	1. Adjust the brightness and contrast knobs on the front panel; 2. Adjust the 8 level TGC and the total gain knob on the front panel; 3. Clean the screen optical filter.
4	Unclear near field	1. Adjust the total gain knob on the front panel and the 8 level TGC; 2. Adjust the focus position to the near field;
5	Unclear far field	1. Adjust the total gain knob on the front panel and the 8 level TGC; 2. Adjust the focus number, space and position to set the focus in the far field.

## **14 Transportation and Storage**

### **14.1 Environment requirements on transportation and storage**

Environment temperature range: -20°C ~ +55°C

Relative humidity range: <80% (20°C)

### **14.2 Transportation**

Signs on the packing box conform to 《Iconograph and sign of packing, storage and transportation》(GB/T191-2008) . Simple shockproof establishment is fitted within the box, which apply to aviation, railway, highway or steamship transportation. Keep dry, avoid inversion and collision.

### **14.3 Storage**

Equipment should be taken out from the packing when storage time exceeds six months, power on it for four hours, and then pack it correctly and keep it in a warehouse. The device must not be piled, and do not place it closely against the floor, walls or roof.

Keep it well ventilated, do not expose it to strong sunlight or caustic gases.

## Appendix A Acoustic output reporting table

**B mode**

**Nominal frequency: 3.5MHz**

**Transducer Model: C3-1/60R/3.5MHz**

**Manufactured By: SHENZHEN WELL.D MEDICAL ELECTRONIC CO.,LTD.**

Index label		MI	TIS		TIB		TIC	
			Scan	Non-scan		Non-scan		
				A <sub>aprt</sub> ≤1cm <sup>2</sup>	A <sub>aprt</sub> >1cm <sup>2</sup>			
<b>Maximum index value</b>		0.85	0.98	-	-	-	(a)	
<b>Associated acoustic parameters</b>	P <sub>ra</sub> (MPa)	1.46						
	P (mW)		115.2	-		-	#	
	Min.of [P <sub>c</sub> (Z <sub>s</sub> ), I <sub>zpta,a</sub> Z <sub>s</sub> ] (mW)				-			
	Z <sub>s</sub> (cm)				-			
	Z <sub>bp</sub> (cm)				-			
	Z <sub>b</sub> (cm)				-			
	Z at max. I <sub>pi,a</sub> (cm)	5.30						
	d <sub>eq</sub> (Z <sub>b</sub> ) (cm)					-		
	f <sub>awf</sub> (MHz)	2.91	2.91	-	-	-	#	
<b>Other information</b>	Dim of A <sub>aprt</sub>	X (cm)	1.64	-	-	-	#	
		Y (cm)	1.30	-	-	-	#	
	t <sub>d</sub> (μsec)	0.52						
	prr (Hz)	3787						
	p <sub>r</sub> at max. I <sub>pi</sub> (MPa)	2.48						
<b>Operating control conditions</b>	d <sub>eq</sub> at max. I <sub>pi</sub> (cm)					-		
	I <sub>pa,a</sub> at max. MI (W/cm <sup>2</sup> )	207.9						
	F-PIN	1	1	-	-	-	#	
	Power,%	80	80	-	-	-	#	
Angle, °		30	30					
Focus position		7	7					

**Notes:**

- (a) This probe is not intended for transcranial or neonatal cephalic use;

## Acoustic output reporting table

**M mode(Inc B mode)**

**Nominal frequency: 3.5MHz**

**Transducer Model: C3-1/60R/3.5MHz**

**Manufactured By: SHENZHEN WELL.D MEDICAL ELECTRONIC CO.,LTD.**

Index label	MI	TIS			TIB	TIC	
		Scan	Non-scan		Non-scan		
			A <sub>aprt</sub> ≤1cm <sup>2</sup>	A <sub>aprt</sub> >1cm <sup>2</sup>			
<b>Maximum index value</b>	0.89	0.49	-	0.036-	0.11	(a)	
<b>Associated acoustic parameters</b>	P <sub>ra</sub> (MPa)	1.51					
	P (mW)	82.0	-		4.7	#	
	Min.of [P <sub>a</sub> (Z <sub>s</sub> ), I <sub>zpta,aZs</sub> ] (mW)			2.61			
	Z <sub>s</sub> (cm)			2.94			
	Z <sub>dp</sub> (cm)			2.94			
	Z <sub>b</sub> (cm)				5.07		
	Z at max. I <sub>pi,a</sub> (cm)	5.30					
	d <sub>eq</sub> (Z <sub>b</sub> ) (cm)				0.35		
	f <sub>awf</sub> (MHz)	2.91	2.91	-	2.90	2.90	
<b>Other information</b>	Dim of A <sub>aprt</sub>	X (cm)	2.35	-	2.34	2.34	
		Y (cm)	1.30	-	1.30	1.30	
	t <sub>d</sub> (μsec)	0.53					
	prr (Hz)	4166					
	p <sub>r</sub> at max. I <sub>pi</sub> (MPa)	2.58					
<b>Operating control conditions</b>	d <sub>eq</sub> at max. I <sub>pi</sub> (cm)				0.34		
	I <sub>pa,a</sub> at max. MI (W/cm <sup>2</sup> )	203.9					
	F-PIN	1	1	-	1	1	
	Power,%	80%	80%	-	80%	80%	
	Angle, °	30	30		30	30	
	Focus position	7	7	-	7	7	
	M Speed,S	1.25	1.25	-	1.25	1.25	

### Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

## Acoustic output reporting table

### B mode

Nominal frequency: 5.0MHz

Transducer Model: C1-6/20R/5.0MHz

Manufactured By: SHENZHEN WELL.D MEDICAL ELECTRONIC CO.,LTD.

Index label	MI	TIS			TIB	TIC		
		Scan	Non-scan					
			A <sub>aprt</sub> ≤1cm <sup>2</sup>	A <sub>aprt</sub> >1cm <sup>2</sup>				
Maximum index value	0.64	0.19	-	-	-	(a)		
Associated acoustic parameters	P <sub>ra</sub> (MPa)	1.26						
	P (mW)		10.0	-		#		
	Min.of [P <sub>a</sub> (z <sub>s</sub> ), I <sub>zpta,a</sub> z <sub>s</sub> ] (mW)				-			
	Z <sub>s</sub> (cm)				-			
	Z <sub>bp</sub> (cm)				-			
	Z <sub>b</sub> (cm)				-			
	Z at max. I <sub>pi,a</sub> (cm)	2.98						
	d <sub>eq</sub> (Z <sub>b</sub> ) (cm)				-			
	f <sub>awf</sub> (MHz)	3.87	3.87	-	-	#		
Other information	Dim of A <sub>aprt</sub>	X (cm)	0.52	-	-	#		
		Y (cm)	0.79	-	-	#		
	t <sub>d</sub> (μsec)	0.43						
	prr (Hz)	4784						
	p <sub>r</sub> at max. I <sub>pi</sub> (MPa)	1.87						
Operating control conditions	d <sub>eq</sub> at max. I <sub>pi</sub> (cm)				-			
	I <sub>pa,a</sub> at max. MI (W/cm <sup>2</sup> )	117.2						
	F-PIN	1	1	-	-	#		
	Power,%	80	80	-	-	#		
Angle, °	90	90						
	Focus position	6	6	-	-	#		

### Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

## Acoustic output reporting table

**M mode(inc B mode)**

**Nominal frequency: 5.0MHz**

**Transducer Model: C1-6/20R/5.0MHz**

**Manufactured By: SHENZHEN WELL.D MEDICAL ELECTRONIC CO.,LTD.**

Index label	MI	T/S			TIB	T/C		
		Scan	Non-scan					
			A <sub>aprt</sub> ≤1cm <sup>2</sup>	A <sub>aprt</sub> >1cm <sup>2</sup>				
Maximum index value	0.66	0.22	0.025	-	0.05	(a)		
Associated acoustic parameters	P <sub>ra</sub> (MPa)	1.29						
	P (mW)		11.6	1.35	1.35	#		
	Min.of [P <sub>a</sub> (z <sub>s</sub> ), I <sub>zpta,a</sub> z <sub>s</sub> ] (mW)				-			
	Z <sub>s</sub> (cm)				-			
	Z <sub>bp</sub> (cm)				-			
	Z <sub>b</sub> (cm)				2.68			
	Z at max. I <sub>pi,a</sub> (cm)	3.00						
	d <sub>eq</sub> (Z <sub>b</sub> ) (cm)				0.31			
	f <sub>awf</sub> (MHz)	3.86	3.86	3.88	-	3.88		
Other information	Dim of A <sub>aprt</sub>	X (cm)	0.63	0.63	-	0.63		
		Y (cm)	0.79	0.80	-	0.80		
	t <sub>d</sub> (μsec)	0.43						
	prr (Hz)	4807						
	p <sub>r</sub> at max. I <sub>pi</sub> (MPa)	1.93						
Operating control conditions	d <sub>eq</sub> at max. I <sub>pi</sub> (cm)				0.30			
	I <sub>pa,a</sub> at max. MI (W/cm <sup>2</sup> )	119.1						
	F-PIN	1	1	1	-	1		
	Power,%	80%	80%	80%	-	80%		
	Angle, °	90	90	90	-	90		
Focus position		6	6	6	-	6		
M Speed,S		1.25	1.25	1.25	-	1.25		

### Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

## Acoustic output reporting table

**B mode**

**Nominal frequency: 7.5MHz**

**Transducer Model: L3-1/7.5MHz**

**Manufactured By: SHENZHEN WELL.D MEDICAL ELECTRONIC CO.,LTD.**

Index label		MI	T/S		TIB	T/C	
			Scan	Non-scan			
				A <sub>aprt</sub> ≤1cm <sup>2</sup>	A <sub>aprt</sub> >1cm <sup>2</sup>		
Maximum index value		0.54	0.64	-	-	- (a)	
Associated acoustic parameters	P <sub>ra</sub> (MPa)	1.30					
	P (mW)		24.0	-		- #	
	Min.of [P <sub>a</sub> (z <sub>s</sub> ), I <sub>zpta,a</sub> z <sub>s</sub> ] (mW)				-		
	Z <sub>s</sub> (cm)				-		
	Z <sub>bp</sub> (cm)				-		
	Z <sub>b</sub> (cm)				-		
	Z at max. I <sub>pi,a</sub> (cm)	4.9					
	d <sub>eq</sub> (Z <sub>b</sub> ) (cm)				-	-	
	f <sub>awf</sub> (MHz)	5.70	5.70	-	-	- #	
Other information	Dim of A <sub>aprt</sub>	X (cm)	1.02	-	-	- #	
		Y (cm)	0.71	-	-	- #	
	t <sub>d</sub> (μsec)	0.28					
	prr (Hz)	5649					
	p <sub>r</sub> at max. I <sub>pi</sub> (MPa)	3.41					
Operating control conditions	d <sub>eq</sub> at max. I <sub>pi</sub> (cm)				-		
	I <sub>pa,a</sub> at max. MI (W/cm <sup>2</sup> )	109.6					
	F-PIN	1	1	-	-	- #	
Power,%		80%	80%	-	-	- #	
Focus position		3	3	-	-	- #	

### Notes:

- (a) This probe is not intended for transcranial or neonatal cephalic use;

## Acoustic output reporting table

**M-mode(Inc B mode)**

**Nominal frequency: 7.5MHz**

**Transducer Model: L3-1/7.5MHz**

**Manufactured By: SHENZHEN WELL.D MEDICAL ELECTRONIC CO.,LTD.**

Index label	MI	TIS			TIB	TIC		
		Scan	Non-scan					
			A <sub>aprt</sub> ≤1cm <sup>2</sup>	A <sub>aprt</sub> >1cm <sup>2</sup>				
Maximum index value	0.56	0.60	0.029	-	0.045	(a)		
<b>Associated acoustic parameters</b>	P <sub>ra</sub> (MPa)	1.34						
	P (mW)		22.1	1.06	1.06	#		
	Min.of [P <sub>a</sub> (z <sub>s</sub> ), I <sub>zpta,a</sub> z <sub>s</sub> ] (mW)				-			
	Z <sub>s</sub> (cm)				-			
	Z <sub>bp</sub> (cm)				-			
	Z <sub>b</sub> (cm)				2.47			
	Z at max. I <sub>pi,a</sub> (cm)	4.90						
	d <sub>eq</sub> (Z <sub>b</sub> ) (cm)				0.20			
	f <sub>awf</sub> (MHz)	5.70	5.70	5.70	-	5..70		
<b>Other information</b>	Dim of A <sub>aprt</sub>	X (cm)	1.01	1.00	-	1.00		
		Y (cm)	0.70	0.70	-	0.70		
	t <sub>d</sub> (μsec)	0.28						
	prr (Hz)	5681						
	p <sub>r</sub> at max. I <sub>pi</sub> (MPa)	3.52						
<b>Operating control conditions</b>	d <sub>eq</sub> at max. I <sub>pi</sub> (cm)				0.19			
	I <sub>pa,a</sub> at max. MI (W/cm <sup>2</sup> )	109.7						
	F-PIN	1	1	1	-	1		
	Power,%	80%	80%	80%	-	80%		
	Focus position	3	3	3	-	3		
	M Speed,S	1.25	1.25	1.25	-	1.25		

### Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

## Acoustic output reporting table

### B mode

Nominal frequency: 6.5MHz

Transducer Model: EC1-1/13R/6.5MHz

Manufactured By: SHENZHEN WELL.D MEDICAL ELECTRONIC CO.,LTD.

Index label	MI	TIS			TIB	TIC		
		Scan	Non-scan					
			A <sub>aprt</sub> ≤1cm <sup>2</sup>	A <sub>aprt</sub> >1cm <sup>2</sup>				
Maximum index value	0.64	0.23	-	-	-	(a)		
Associated acoustic parameters	P <sub>ra</sub> (MPa)	1.38						
	P (mW)		10.0	-		#		
	Min.of [P <sub>a</sub> (z <sub>s</sub> ), I <sub>zpta,a</sub> z <sub>s</sub> ] (mW)				-			
	Z <sub>s</sub> (cm)				-			
	Z <sub>bp</sub> (cm)				-			
	Z <sub>b</sub> (cm)				-			
	Z at max. I <sub>pi,a</sub> (cm)	2.48						
	d <sub>eq</sub> (Z <sub>b</sub> ) (cm)				-			
	f <sub>awf</sub> (MHz)	4.66	4.66	-	-	#		
Other information	Dim of A <sub>aprt</sub>	X (cm)	0.63	-	-	#		
		Y (cm)	0.79	-	-	#		
	t <sub>d</sub> (μsec)	0.31						
	prr (Hz)	4807						
	p <sub>r</sub> at max. I <sub>pi</sub> (MPa)	2.05						
Operating control conditions	d <sub>eq</sub> at max. I <sub>pi</sub> (cm)				-			
	I <sub>pa,a</sub> at max. MI (W/cm <sup>2</sup> )	120.1						
	F-PIN	1	1	-	-	#		
	Power,%	80	80	-	-	#		
Focus position	Angle, °	120	120					
	Focus position	3	3	-	-	#		

### Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

## Acoustic output reporting table

**M-mode(Inc B mode)**

**Nominal frequency: 6.5MHz**

**Transducer Model: EC1-1/13R/6.5MHz**

**Manufactured By: SHENZHEN WELL.D MEDICAL ELECTRONIC CO.,LTD.**

Index label		MI	T/S			TIB	T/C		
			Scan	Non-scan					
				A <sub>aprt</sub> ≤1cm <sup>2</sup>	A <sub>aprt</sub> >1cm <sup>2</sup>				
Maximum index value		0.65	0.23	0.014	-	0.026	(a)		
<b>Associated acoustic parameters</b>	P <sub>ra</sub> (MPa)	1.41							
	P (mW)		10.2	0.62		0.62	#		
	Min.of [P <sub>a</sub> (z <sub>s</sub> ), I <sub>zpta,a</sub> z <sub>s</sub> ] (mW)				-				
	Z <sub>s</sub> (cm)				-				
	Z <sub>bp</sub> (cm)				-				
	Z <sub>b</sub> (cm)					2.36			
	Z at max. I <sub>pi,a</sub> (cm)	2.34							
	d <sub>eq</sub> (Z <sub>b</sub> ) (cm)					0.26			
	f <sub>awf</sub> (MHz)	4.66	4.66	4.61	-	4.61	#		
<b>Other information</b>	Dim of A <sub>aprt</sub>	X (cm)	0.62	0.62	-	0.62	#		
		Y (cm)	0.80	0.79	-	0.79	#		
	t <sub>d</sub> (μsec)	0.31							
	prr (Hz)	4807							
	p <sub>r</sub> at max. I <sub>pi</sub> (MPa)	2.05							
<b>Operating control conditions</b>	d <sub>eq</sub> at max. I <sub>pi</sub> (cm)					0.25			
	I <sub>pa,a</sub> at max. MI (W/cm <sup>2</sup> )	124.1							
	F-PIN	1	1	1	-	1	#		
	Power,%	80%	80%	80%	-	80%	#		
	Angle, °	120	120	120	-	120	#		
Focus position		3	3	3	-	3	#		
M Speed,S		1.25	1.25	1.25	-	1.25	#		

### Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

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